CHESTER, NJ FOR FULL ORCHESTRA AND ELECTRONICS AND THE CHROMATIC SCALE AND OTHER ITERATIVE LOOPS IN BEAT FURRER'S *KONZERT FÜR KLAVIER UND ORCHESTER*

by

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STATEMENT OF DISSERTATION APPROVAL

The dissertation of **Devin Cole Maxwell**

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ABSTRACT

Chester, NJ is a composition for electronics and full orchestra that explores the relationship between the propensity for artificiality inherent in electronic music and the richly human experience of performing orchestral music. The work unfolds in four distinct sections, outlining a slow moving symmetrical ascent of major thirds: C E G# and C.

The analysis of Beat Furrer's *Konzert für Klavier and Orchester* asserts that Furrer's concerto self-defines through a number of iterative loops, the most important being the recurrence and transformation of the ordered chromatic collection: the chromatic scale. Furrer's extensive and clear use of the chromatic scale in conjunction with other identity-building loops places his concerto in the category of a *strange loop* as defined by Douglas Hofstadter.

This dissertation is dedicated to Konstantine Zsigo.

TABLE OF CONTENTS

Appendices

GLOSSARY OF COMMON TERMS

Work-Idea Terms

Work-idea: The core unifying musical or extra-musical idea of a musical composition.

Iterative Loop: A loop that results in one or more related instances, or iterations. Criteria for classifying these loops can be very narrow or very broad, allowing for iterative loops to impact the composition on a number of different levels.

Chromatic Event Transformation Loops: Iterative loops of *chromatic event* sub-groups, or *Chromatic Event Group 3* that produce instances of related and transformed musical material throughout the composition. Each *chromatic event* sub-group or *Chromatic Event Group 3* represents a unique *chromatic event* transformation loop

Pitch Class Loops: A pitch class loop is a full pitch class ascent or descent through the ordered chromatic scale.

Call and Response Loops: Iterative loops based literally or loosely on the idea of call and response.

Chromatic Event Terms

Chromatic Event: A *chromatic event* is a collection of musical material that often occurs for an entire *segment*. The material can have a direct relationship with the chromatic scale if it includes an ascent of at least {0, 1, 2, 3} or an indirect relationship with the chromatic scale, which would include vertical sonorities, smaller ascents than {0, 1, 2, 3} and change of direction from ascent to descent or descent to ascent.

Chromatic Event Group: A *chromatic event group* is a collection of similar *chromatic events* that occur throughout the composition.

Chromatic Event Sub-group: A *chromatic event* sub-group is a collection of *chromatic events* within a *chromatic event group* that are varied throughout the composition, but always retain similar musical characteristics.

Formal Units

Segment: A *segment* is a formal unit that contains single or multiple *chromatic events*. *Chromatic events* within segments are always layered within a *segment* and *segments* tend to last from five to ten measures.

Part: *Parts* are formal units comprised of single *segments* or multiple *segments*. There are three types of *parts:* a *call*, a *response,* and *a transition.*

Section: Sections are the largest formal unit in the composition and consist of at least two *parts*.

Musical Terms

Pitch Class: A pitch class represents all instances of a given pitch. For instance, pitch class C includes the lowest C on the piano, C1, and the highest C, C8.

Interval Class: Interval class considers an interval and its inversion as one of the same, resulting in six possible non-unison interval classes: m2, M2, m3, M3, P4, Tritone.

Convergent Motion: Convergent motion occurs when an interval class is collapsing on a pitch class.

Divergent Motion: Divergent motion occurs when an interval class is expanding from a pitch class

Tessitura: Most active range of a passage.

Articulated Pedal: Repeated pitch class that functions as a pedal.

Arpeggiation: Octave displacement of a harmony or harmonies.

Anticipation: Pre-reference for an impending pitch class.

Suspension: Post-reference for a previous pitch class.

Pitch Collection: Ordered set of pitch classes used throughout the composition.

Varied Ostinato(i): Ostinati that are used to generate material, mostly in *CEG 6*. While the resultant material is never an actual ostinato, the template used to generate the musical material is a strictly repeating pattern.

Mensuration Canon: A canon in which the voices move at different rates of speed.

Pitch Cycle: A C-C pitch class loop in *S2R*.

Rhythmic Cycle: A complete rhythmic cycle of *Chromatic Ascent 1* or *Chromatic Ascent 2* that returns the phasing rhythm to the downbeat of a measure.

Rhythmic Unison: A unison moment between *Chromatic Ascent 1* and *Chromatic Ascent 2* that is a direct result of the construction of the mensuration canon.

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I would like to thank first and foremost Morris Rosenzweig for pushing me musically and intellectually for the past four, going on five years. His high standards and helpful feedback encouraged my development both as a composer and musician. Without the support of the school orchestra, this project would not have been nearly as successful, so thanks to Robert Baldwin and the Utah Philharmonia. Additionally, *Chester, NJ* was completed as a Graduate Research Assistantship through the Graduate School at the University of Utah. The support of the Graduate School and the School of Music allowed *Chester, NJ* to flourish. Thanks as well to the other members of my committee for sticking with me and thanks to all the professors, staff, and students in the School of Music, especially Haruhito Miyagi.

My parents, Betsy and Hal Maxwell, introduced me to music early on in my life and have been a constant source of support and encouragement ever since I can remember. Without them, none of this would have been possible. Barbara Maxwell, my grandmother from Laurel, Mississippi, always (sometimes forcibly) encouraged to continue my education and while she is no longer with us, her determination was a driving force for me actually completing this project and this degree.

Finally, without the support of my immediate family, none of this would have been possible. Katie, June, Roscoe, and baby yet-to-be-named, thanks for inspiring me to keep on keeping on.

PART I

CHESTER, NJ FOR FULL ORCHESTRA AND ELECTRONICS

Devin Maxwell

Chester, NJ
for Orchestra and Electronics
Full Score

Good Child Music
Brooklyn, NY

www.goodchildmusic.com

Full Score

Devin Maxwell

Chester, NJ

Transposed Score *
Accidentals Carry Through Each Bar

Flute/Picc. 1, Flute 2, Oboe 1, Oboe 2, Clarinet in Bb 1, Clarinet in Bb 2, Bassoon 1, Bassoon 2,
Horn in F 1, Horn in F 2, C Trumpet 1, C Trumpet 2, C Trumpet 3, Trombone 1, Trombone 2, Trombone 3, Tuba,
Timpani, Xylophone/Glockenspiel,
Percussion 1 [Tenor Drum (Covered + Uncovered), Bass Drum w/ Wire Brushes, Susp. Cymb.],
Percussion 2 [Bass Drum, Tenor Drum (Covered + Uncovered)]
Harp, Violin 1, Violin 2, Viola, 'Cello, Double Bass **
5-Channel Electronic Tape ***

* The glockenspiel sounds two octaves higher than written, the piccolo and xylophone sound one octave higher than writtten, and the double bass sounds one octave lower than written including harmonics.
** The Double Bass should be amplified and sent to Spaker 5 from P-R.
*** The electronics part should play back through five discrete speakers spread throughout the ensemble. The tape reduction in the score is not indicative of channel assignment. The tape part is evenly distributed throughout all five speakers throughout the piece. To perform the tape parts, use any multi-channel playback software and interface that supports 6 channel playback and two-channel imput. Included is a MIDI file that can be used to import a tempo map into the multi-channel audio software. To synchronize the audio tracks, simply place all the files all at measure 1 after importing the MIDI file.

Channels 1 and 2 should be played through full-frequency PA speakers, channels 3 and 4 should be played through guitar amplifiers (2 X 10" cabinet or equivalent), and channel 5 should be played through a bass amplifier (1 X 15" or equivalent). Channel 6 is a click track for the condctor. The audio should be mixed such that the electronics are equal in volume to the orchestra one bar before C. All in all, there will be 10-12 audio tracks and six output channels used for performance:

Track 1 - Pre-recorded audio for Speaker 1
Track 2 - Pre-recorded audio for Speaker 2
Track 3 - Pre-recorded audio for Speaker 3
Track 4 - Pre-recorded audio for Speaker 4
Track 5 - Pre-recorded audio for Speaker 5
Track 6 - Click Track
Track 7+8 - Bass + Orchestra Loop 1 - Assigned to Speaker 1
Track 8+9 - Bass + Orchestra Loop 2 - Assigned to Speaker 2
Track 10 - Orchestra Loop 3 - Assigned to Speaker 3
Track 11 - Bass pass-through to amplifier - Assigned to Speaker 5
Track 12 - Orchestra pass-through to amplifier - Assigned to Speaker 4

Two microphones will be needed for performance. One should be placed near the conductor so that the entire orchestra is captured as best as possible by the microphone and the other one should be used to amplify the principle double bass part from P-R. Both microphones are used to create the "loops" for sections P, Q, and R. Optionaly, the orchestra microphone can be used "live" and fed to Speaker 4 starting at letter S to the end. The double bass should be sent to Speaker 5 and distorted slighty or more either by the amplifier, pedal, or other signal processing.

The looping section, from letter P to the end, can be realized by pre-recording material or using live looping software or hardware. Both the isolated bass and conductor microphone will need to be recorded and played back. The bass should not be recorded or passed through the amplifier starting at R. Loop 1 and Loop 2 should still play, but there is no Loop 3 for the bass. Optionally, the orchestra microphone can be fed through speaker 4 speakers starting at S to the end of the piece.

Pre-Recorded Option

During a rehearsal, record in separate passes the following material:
P-Q (Loop 1)
Q-R (Loop 2)
R-S (Loop 3)

Then align the loops to playback as follows:
Loop 1 plays back at Q, R, and S through Channel 1
Loop 2 plays back twice at R and S through Channel 2
Loop 3 plays back once at letter S through Channels 3 and 4

Live Option

Using loop pedals, plug-ins, custom software, or tape machines, create three live 26.66 second loops:
P-Q (Loop 1) - assigned to Channel 1
Q-R (Loop 2) - assigned to Channel 2
R-S (Loop 3) assigned to Channels 3 and 4

Play Loop 1 three times starting at Q, Loop 2 twice starting at R, and Loop 3 once starting at S

Chester, NJ

for Konstantine Zsigo

Flute 1/Piccolo
Flute 2
Oboe 1
Oboe 2
Clarinet in B♭ 1
Clarinet in B♭ 2
Bassoon 1
Bassoon 2
Horn in F 1
Horn in F 2
Trumpet in C 1
Trumpet in C 2
Trumpet in C 3
Trombone 1
Trombone 2
Trombone 3
Tuba
Timpani
Glockenspiel/Xylophone
Percussion 1 (Susp. Cymb., T. D., B. D. w/Brushes)
Percussion 2 (T. D., B. D.)
Harp
Violin I
Violin II
Viola
Violoncello
Double Bass
Tape 1
Tape 2
Tape 3
Tape 4

Glockenspiel

pizz.

5 6 7 8

Fl. 1
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Glock.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

To Xyl.

arco

9 10 11 12 13

A

Fl. 1
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Glock.
Perc. 1
Perc. 2
Tenor Drum
w/ Snare Sticks
Bass Drum
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
arco
arco
Tp. 1
Tp. 2
Tp. 3
Tp. 4

14 15 16 17 18

Fl. 1
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Glock.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

19 20 21 22 23 B ♩ = 72

Fl. 1
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Glock.
Xylophone
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
pizz.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

24 25 26 27 28 29

Fl. 1
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Glock.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

arco

30 31 32 33 34 C

Electronics Solo

FL. 1 FL. 2 Ob. 1 Ob. 2 Cl. in Bb 1 Cl. in Bb 2 Bsn. 1 Bsn. 2

Hn. in F 1 Hn. in F 2 C Tpt. 1 C Tpt. 2 C Tpt. 3 Tbn. 1 Tbn. 2 Tbn. 3 Tba.

Timp.

To Glock.

Glock. Perc. 1 Perc. 2 Hp.

Electronics Solo

Vln. I Vln. II Vla. Vc. Db.

Tp. 1 Tp. 2 Tp. 3 Tp. 4

Fl. 1
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Glock.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

3/4

Fl. 1
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Glock.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

35 36 37 38 39 40

D ♩ = 180

Fl. 1
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Glock.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

41 42 43 44 45 46 47

♩ = 90

Fl. 1
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Glock.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

Glockenspiel

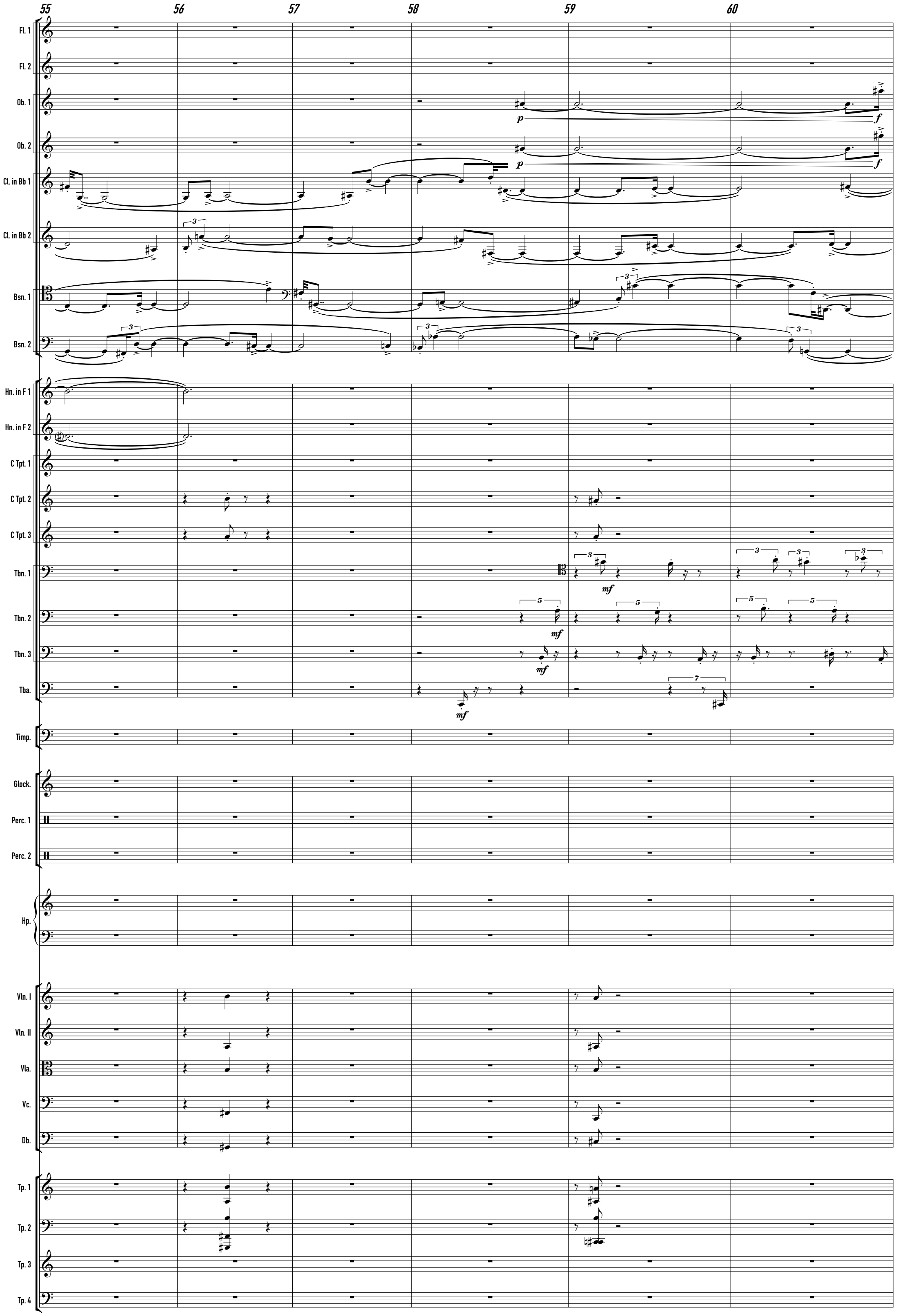
(C)

E

48 49 50 51 52 53 54

Fl. 1
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Glock.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

mf *mp* *p* *f* *l. v. sempre* pizz.


55
56
57
58
59
60
Fl. 1
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Glock.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4
p
f
mf

61 62 63 64 65 66

Fl. 1
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Glock.
Susp. Cymb.
w/Yarn Mallets
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

54

67 68 69 70 71

Fl. 1
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Glock.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

72 73 74 75 76 77

F ♩ = 72

Fl. 1
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Glock.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

78 79 80 81 82 83 84 85

3/4 G

Fl. 1
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Glock.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

p *mf* *l. v.* Sul E Sul C div.

86 87 88 89 90 91 92

Fl. 1
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Glock.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

pp *p l. v.*

H ♩ = 104

93 94 95 96 97 98 99 100 101

Fl. 1
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Glock.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

pp p mf f unis.

102 103 104 105 106 107 108 109 110

5/4 4/4

Fl. 1 Fl. 2 Ob. 1 Ob. 2 Cl. in Bb 1 Cl. in Bb 2 Bsn. 1 Bsn. 2

Hn. in F 1 Hn. in F 2 C Tpt. 1 C Tpt. 2 C Tpt. 3 Tbn. 1 Tbn. 2 Tbn. 3 Tba.

Timp.

Glock. Perc. 1 Perc. 2

Hp.

Vln. I Vln. II Vla. Vc. Db.

15

Tp. 1 Tp. 2 Tp. 3 Tp. 4

111 112 113 114 115 116 117 To Picc. 118

Fl. 1
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Glock.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

119 120 121 122 123 124 125

Piccolo

Fl. 1
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Glock.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

pizz
pizz.

J = 132

126 127 128 129 130 131 132 133 134 135

Picc.
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Glock.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

ff
mp
f
To Xyl.
non. div.
arco

136 137 138 139 140 141 142 143

Picc.
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Glock.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
15
Tp. 1
Tp. 2
Tp. 3
Tp. 4

144 145 146 147 148 149 150 151

Picc.
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Glock.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

mf
non arp.
ff
pizz.
arco
f
15mb

152 153 154 156 157 158

K

Picc.
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Glock.
Perc. 1
Perc. 2
Tenor Drum
w/Snare Sticks
Bass Drum
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

159 160 161 162 163

Picc.
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
l. v.
Glock.
Perc. 1
Perc. 2
f
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

164 165 166 167 168 169

Picc.
FL. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Glock.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

170 171 172 173 174

Picc.
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Glock.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

ff

175 176 177 178

Picc.
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Glock.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

f
ff
Xylophone
Tenor Drum
Rim Shot
mf 5
8va
(8)

179 180 181 182 183 184

Picc.
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Xylo.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

Susp. Cymbal
w/Snare Sticks

fp

185 186 187 188 189

Picc.
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Xylo.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

190 191 192 193 194

Picc.
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Xylo.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

195 196 197 M 199 200 201 202

Picc.
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Xylo.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

muted
To Glock.
Bass Drum w/Brushes
T. D. (covered) w/Timp. Sticks
Bass Drum w/Timp. Sticks Dead Stroke
non div.
gliss.

203 204 205 206 207 208 209 210

Picc.
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Xylo.
Perc. 1
Perc. 2
Press Roll
sim.
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4
gliss.

211 212 213 214 215 216 217

Picc.
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Xylo.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

ff *p* *f* *mf* *gliss.*

(8) (15)

218 219 220 221 222 223 224

Optimistic Shout

Picc.
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Xylo.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

ff Hey!
fff
mf
f
l. v.
pizz.
mute off
T. D. (uncovered) w/Snare Sticks
B. D. Beaters
gliss.
(8)
(15)

225 226 227 228 229 230 231

Picc.
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Glockenspiel
Glock.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

p *mf* *ff* *f* *mp* *l. v.* 8va (15)

232 233 234 235 236 237 238 239 240

N ♩. = 40

Picc.
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Glock.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

pp
ppp
mp
p
l. v.
Susp. Cymb.
w/Yarn Mallets
solo
Sul D

241 242 243 244

Picc.
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Glock.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

p *ppp* *pp* arco

30

♩ = 136

245 246 247 248 249 250

Picc.
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Glock.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

251 252 253 254 255 256 257 258

♩ = 104

♩ = 80

Picc.
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Glock.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

arco

259 260 261 262 263 264 265 266

♩ = 160 ♩ = 140

Picc.
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Glock.
T. D. (covered) w/Timp. Sticks
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

non div. mute on
mute on non div.
non div. mute on
mute off
mute off

267 268 269 270 271 272 273 274 275

♩ = 110

Picc.
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Glock.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

T. D. (covered)
w/Snare Sticks
Bass Drum
non. div.
mute off

276 277 278 279 280 281 282

♩ = 90

Picc.
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Glock.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

284 285 286 287 288 289 290 291

♩ = 60

Picc.
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Glock.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

P

292 293 294 295 296 297 298

♩ = 90

Picc.
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Glock.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

div.
solo

Loop 1
Record

299 300 301 302 303 304 305

Picc.
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Glock.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

f *ff* *l. v.*

unis.
pizz.

div.
unison

tutti pizz.

Q

307 308 309

Picc.
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Glock.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

arco
arco solo

Loop 1
Play

Loop 2
Record

310 311 312 313 314

Picc.
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Glock.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

Tenor Drum (covered)
w/Snare Sticks
Bass Drum

315 R 316 317 318

Picc.
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Glock.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

ff

ff tutti

Loop 1 Play

Loop 2 Play

Loop 3 Record

319 320 321 322 323

Picc.
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Glock.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

ff

324 S 325 326 327

Picc. fff
Fl. 2 fff
Ob. 1 fff
Ob. 2 fff
Cl. in Bb 1 fff
Cl. in Bb 2 fff
Bsn. 1 fff
Bsn. 2 fff

Hn. in F 1 fff
Hn. in F 2 fff
C Tpt. 1 fff
C Tpt. 2 fff
C Tpt. 3 fff
Tbn. 1 fff
Tbn. 2 fff
Tbn. 3 fff
Tba. fff

Timp.

Glock.
Perc. 1 Tenor Drum (Covered)
Perc. 2 mf Bass Drum (Muted) mf

Hp.

Vln. I fff
Vln. II fff
Vla. fff
Vc. fff
Db. fff

Loop 1 Play
Tp. 1 f
Loop 2 Play
Tp. 2 f
Loop 3 Play
Tp. 3 ff
Tp. 4 ff

328 329 330 331 332 333

Picc.
Fl. 2
Ob. 1
Ob. 2
Cl. in Bb 1
Cl. in Bb 2
Bsn. 1
Bsn. 2
Hn. in F 1
Hn. in F 2
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Timp.
Glock.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Db.
Tp. 1
Tp. 2
Tp. 3
Tp. 4

ffff *fff* *8vb*

fin
Wanship, UT
January 2015

SUPPLEMENTAL ELECTRONICS

The CD-ROM bundled with this project contains the following 7 files:

1. L.aiff – Audio for the far left loudspeaker
2. LC.aiff – Audio for the loudspeaker directly to the left of the center speaker
3. C.aiff – Audio for the center loudspeaker
4. RC.aiff – Audio for the loudspeaker directly to the right of the center speaker
5. R.auff – Audio for the far right loudspeaker
6. Click.aiff – Audio click track for the conductor
7. TempoMap.mid – General MIDI file that contains a tempo map of the composition

All audio files are mono, 16-bit, 44.1khz uncompressed .aiff files. The CD-ROM is readable by both Macintosh and PC computers.

PART II

THE CHROMATIC SCALE AND OTHER ITERATIVE LOOPS IN BEAT FURRER'S *KONZERT FÜR KLAVIER UND ORCHESTER*

CHAPTER 1

INTRODUCTION

Beat Furrer's thoroughly complex *Konzert für Klavier und Orchester* has a unique and structurally profound relationship with a most basic element of music: the ordered form of the chromatic collection. This relationship is generally nested in nature; it is reflected on the smallest unit of music through to the largest. Evidence provided by this detailed analysis of Furrer's concerto will establish, then reinforce, the argument that contextualizing the concerto's relationship with the ordered chromatic collection, in conjunction with other attributes, projects a potential extra-musical meaning.

You will see that the chromatic scale, in ordered form, generates many of the points of instigation for a number of the concerto's contents. Music is regularly presented that features sequentially chromatic ascents and descents as primary material. Chromatically transposed varied ostinati recur throughout, often contributing to a rising or falling far-reaching chromatic framework that connects numerous musical events. Once it is established that this concerto indeed uses the chromatic scale to generate its basic material substance and that use of the chromatic scale changes in response to the form of the piece, a deeper inquiry can be launched as to what this piece is truly about.

Work-Idea and the Chromatic Scale

First, what is a *work-idea*? *Work-idea* is a broadly defined concept, proposed by Dieter Schnabel, that allows for an idea, musical or extra-musical, to permeate, regulate, and define the form and elements of a musical composition. In the *Young Composers* issue of *Die Reihe*, Schnabel used this term to illustrate that symmetry is the *work-idea* governing the spectrum of compositional decisions Karlheinz Stockhausen made while composing *Klavierstücke III.* Schnabel asserts that pitches, rhythms, dynamics, gestures or motives, and form are generated or transformed by direct or indirect relationships with symmetry. Moreover, asymmetry is used throughout the work in an "interlocking of symmetry and asymmetry," in order to meticulously explore its *work-idea*.[1] In order for a concept to qualify as a *work-idea*, it requires comprehensive, rigorous integration into every aspect of the composition, described by Schnabel:

> Now: what, in concrete terms, is a work-idea, construction? It is a regulator, regulating the flow of the elements and at the same time determining their selection – their shape. Thus in a sense it exists before, behind, and within every piece. Stockhausen has described the proposition: 'Different shapes in the same all-penetrating light.' The presence of a work-idea is such a light.
>
> We shall take the third piano piece as an example of this infiltration of a piece by the work-idea, and of the identity between the two. In this case, work-idea might be described in some such way: in the course of the piece, which uses five different, closely-related time structures, intended symmetry is to become apparent.[2]

If indeed, the evidence provided in this talk can establish that a large part, if not all, the musical material in this concerto is regulated, unified, determined, or connected

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[1] Schnabel, "Karlheinz Stockhausen," *Die Reihe* no. 4, 130.
[2] Ibid., 126.

by the chromatic scale and that the chromatic scale is simply an equal-tempered faint musical intimation of infinite recursion, then a credible *work-idea* of this concerto is: self-identity through infinite iteration. Repetition of the ordered chromatic collection results in instances of pitch class looping, which in turn provides the strongest evidence for this assertion. Additionally, nested "call and response" loops and loops that transform related groups of musical gestures help to define the essence of the concerto – its sense of "self." These three important loops: pitch class loops, "call and response" loops, and transformation loops are the identity-building iterative loops that define and shape Furrer's composition.

Other possible *work-ideas*, such as the role of the piano in a piano concerto (or more broadly, the role of a soloist in the genre of the piano concerto), virtuosity as a compositional device, or extended instrumental techniques as core compositional ideas are possible, but questionable *work-ideas* for the *Konzert*. It would be difficult to assert that any of these concepts could truly exist "before, behind, and within every piece." For instance, the normative concept of the concerto assumes a degree of virtuosity and the duality of the soloist in opposition to the ensemble. These two attributes are simply a result of the chosen genre, not a result of a *work-idea*.

Claiming that iterative looping is the *work-idea* of this concerto would place the concerto into the category of a *strange loop*, as defined by Douglas Hofstadter:

> And yet when I say "strange loop", I have something else in mind – a less concrete, more elusive notion. What I mean by "strange loop" is – here goes a first stab, anyway – not a physical circuit but an abstract loop in which, in the series of stages that constitute the cycling-around, there is a shift from one level of abstraction (or structure) to another, which feels like an upward movement in hierarchy, and yet somehow the successive "upward" shifts turn out to give rise to a closed

> cycle. That is, despite one's sense of departing ever further from one's origin, one winds up, to one's shock, exactly where one had started out. In short, a strange loop is a paradoxical level-crossing feedback loop.[3]

A *strange loop* is not simply a feedback loop, according to Hofstadter, but a loop that contributes to identity:

> In any strange loop that gives rise to human selfhood, by contrast, the level-shifting acts of perception, abstracting, and categorization are central, indispensable elements. It is the upward leap from *raw stimuli* to *symbols* that imbues the loop with "strangeness". The overall gestalt "shape" of one's self – the "stable whorl", so to speak of the strange loop constituting one's "I" - is not picked up by a disinterested, neutral camera, but is perceived in a highly subjective manner though the active processes of categorizing, mental replaying, reflecting, comparing, counterfactualizing, and judging.[4]

In order to propose that identity through iterative loops is the *work-idea* of this concerto, a careful and detailed process of explanation, presentation, and discourse is required. Since this concerto is a dense and lengthy work, 1) formal segmentation, 2) composition-specific terminology, and 3) specific analytical grouping will be discussed first, in Chapter 2. Chapters 3 and 4 examine primary projections of the chromatic scale, or scale as melody, in the solo or ensemble piano, starting with thorough explanations of measures 151 – 159 and measures 172 – 176. Chapter 5 establishes how the form of what we will see in *Section 1* is determined by the transformation and interaction of musical material, and Chapter 6 demonstrates the relationship of the chromatic scale to the material in what shall be discussed as *segments 2k* and *3e*.[5] Chapter 7 reveals how a slowly unfolding chromatic schema unifies the composition while Chapter 8, the

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[3] Douglas Hofstadter, *I am a Strange Loop* (New York: Basic Books, 2007), 101 – 2.
[4] Ibid., 187.
[5] *Sections* and *Segments* are introduced and discussed in Chapter 2.

conclusion, will corroborate that the relationship between the chromatic scale, the musical material, and the form in Beat Furrer's *Konzert für Klavier und Orchester* is sufficiently comprehensive to reinforce the assertion that identity through iteration is the *work-idea* of this composition. The conclusion also explores the musical and philosophical ramifications of identifying this concerto as a *strange loop*.

CHAPTER 2

TERMINOLOGY AND FORM

Before exploring the specific musical mechanics of this concerto, terminology specific to this analysis and a formal segmentation of this composition are presented in this chapter. This paper uses five key terms specific to this analysis:

- *Chromatic events* (*CEs*)
- *Chromatic event groups* (*CEGs*)
- *Sections*
- *Parts*
- *Segments*

These terms are not intended as terms in a general context, but are terms specific to this analysis. This chapter defines these terms then uses them to propose a formal segmentation of the composition.

The following nomenclature is used throughout this analysis in order to convey specific information:

- "T" represents transpositional operation
- "PCo" identifies relevant pitch collections
- "[ ]" indicates a vertical sonority
- "," indicates successive sonorities

- "{ }" indicates a group of unordered pitch classes

When a numerical system is used to identify pitch classes, the following system applies: 0123456789TE where C = 0.

Chromatic Events (CEs) and *Chromatic Event Groups (CEGs)*

This analysis uses the following two terms:

- *Chromatic event* – a collection of musical material that has direct or indirect relationship to the chromatic scale
- *Chromatic event group* – a group of *chromatic events* that share similar musical characteristics

Figure 2.1 contains *chromatic event 1a*, ensemble piano music from measures 1 – 5.[6]

Chromatic Events

Chromatic events comprise a majority of the musical material in this concerto. Single *chromatic events* or layers of *chromatic events* are contained in every *segment*. *Chromatic events* are classified into *chromatic event groups* based on similar musical attributes. A *chromatic event* can only be categorized in a single *CEG.* If a *chromatic event* embodies characteristics of two *CEGs,* it is categorized by the more prevailing characteristic of the two. The vast majority of *chromatic events* occur throughout an entire *segment*. Should the orchestration of a *CE* change, it does so remaining in the same instrument family, e.g. winds to winds. Some *CEs* only include one pitch class, yet these events are valid *chromatic events* involved in the chromatic framework of the

[6] Many score excerpts are given to aid identification of events in the actual score. Reading this paper with an actual hard copy of the score, Appendix A, and Appendix B is recommended.

composition.

Chromatic events can be identified in the score using Appendix A and Appendix B. Appendix A contains eleven tables. The first table lists the ten *CEGs* that occur in this composition with their respective ID #, Name, Abbreviation (used in Appendix B), First Entrance, and Last Entrance. The following ten tables in Appendix A contain critical information about *chromatic events* contained in each *chromatic event group*: ID, Location (by *segment*), Instrument, and Notes. Each row that follows the header of each table represents a unique *chromatic event*.

All *chromatic events* in the composition possess an individual name, based on their *CEG* classification. The name of a *chromatic event* is comprised of two parts: the *chromatic event group* it is contained in followed by the letter ID in column one of its respective table in Appendix A. For instance, *chromatic event 1a* consists of the third row of the second table of Appendix A, *Chromatic Event Group 1: Piano Chromatic Sets*. This row contains specific information about *chromatic event 1a:*

- It is located in *segment 1a*
- It occurs in the ensemble piano part
- It contains a rising chromatic ascent of successive pitch classes, beginning on Bb

At this point, *segments* have not been defined, but it is possible to locate *segments* using Appendix B without having a clear idea of what a *segment* is simply for the purpose of identifying *chromatic event 1a* in the score.

Appendix B consists of a timeline reduction of this concerto containing text descriptions of all identified *chromatic events* that occur in each *segment*. It can be used to locate *chromatic events*. In this analysis, Appendix B is usually presented as an

excerpt, similar to Table 2.1. This excerpt of Appendix B only contains *segment 1a.* The top row of Table 2.1 indicates the time-span of the excerpt in measures. Therefore, *segment 1a* occurs from measures 1 – 5. The second column contains the *chromatic events* that occur during *segment 1a* with each row representing a different *CEG* beginning with the fourth row, labeled "CEG1 PnoChrom" in Table 2.1. In Appendix B and its excerpts, *chromatic events* are only identified by letter ID from their corresponding table in Appendix A. *Chromatic event 1a* can now be identified and located on Table 2.1; it occurs in *segment 1a*. Since Appendix A shows that *chromatic event 1a* includes ensemble piano music in *segment 1a* and Table 2.1, excerpted from Appendix B, shows that *segment 1a* consists of measures 1 – 5, *chromatic event 1a* can be identified in the score, which was already identified in Figure 2.1

Chromatic events can have a direct or indirect relationship with the chromatic scale, which can be demonstrated by examining specific *chromatic events* contained in *segment 2k*. Table 2.2 shows *segment 2k* excerpted from Appendix B. Using the same steps above, one can determine that *segment 2k* occurs from measure 182 – 192. Then, using Appendix A, one can identify *CE 5e* as the second violin and 'cello music in measures 182 through 192, shown in Figure 2.2. *CE 5e* has direct relationship with the chromatic scale, shown by the lower voice chromatic ascent in the 'cello and the upper voice chromatic ascent in the second violin. Now, identify *CE 4m* in the score. The first four measures of *CE 4m* are shown in Figure 2.3. Once identified, one can see that *CE 4m* is comprised of the sustained chords in the flute, oboe, trumpet, and accordion occurring from measure 182 – 192. *CE 4m* does not have a direct relationship with the chromatic scale, it has an indirect relationship with the chromatic scale, due to its

dissonant pitch class content and minor second linear connections.[7]

Chromatic Event Groups

Chromatic event groups contain *chromatic events* that share musical characteristics. The characteristics that classify *chromatic events* into *CEGs* can be defined narrowly, as in *CEG 3*, or broadly – *CEG 4*. The fourth table of Appendix A demonstrates that *CEG 3* contains only six *chromatic events* that all occur in the solo piano and undergo a very narrow range of transformation. Using Appendix B, along with Appendix A, these events can be located in the score. The actual solo piano notation for the first measures of all *chromatic events* contained in *CEG 3* is shown in Figure 2.4. This example clearly demonstrates that *CEG 3 chromatic events* share the following characteristics:

- They all occur in the solo piano
- They all occur on the level of the sixteenth note triplet
- They all contain arpeggiation

Therefore, *CEG 3* is named *Triplet Piano Arpeggios* and contains *chromatic events* that are grouped by a narrowly defined set of criteria.

CEG 4, on the other hand, is comprised of *chromatic events* that primarily involve a sustained note of fifteen counts, usually on the rhythmic level of the sixteenth note. *CE 4e* and *CE 4h* share this characteristic, so they are both, by definition, in *CEG 4*. Using Appendix A, *CE 4e* has the following attributes:

- It occurs in *segment 1k*

[7] Linear chromatic connections are discussed in depth in Chapter 5.

- It occurs in the winds, brass, accordion, crotales, and strings
- It involves two sonorities: [C C# D D# E F F# G A A#] and [F F# B C

Figure 2.5 contains the opening measures of *CE 4e.*

CE 4h, according to Appendix A, has the following attributes:

- It occurs in *segment 1q*
- It is performed by various members of the ensemble
- It is comprised of a descent starting on pitch class Bb

Figure 2.6 is an excerpt from the score of the entirety of *CE 4h*. The parsing criteria for *CEG 4* is broadly defined, so *CEG 4* includes *chromatic events* with a significantly different musical surface. For instance, since *CE 4e* is a vertical sonority, and *CE 4h* is a linear sonority, the difference between *CE 4h* and *CE 4e* is much greater than the difference between *CE 3a* and *3b*. Therefore, the parsing criteria for *chromatic event groups* include a wide spectrum of variation, which means *chromatic event group* classification is not necessarily indicative of *chromatic event* function.

Segments

In addition to the terms *chromatic events* and *chromatic event groups,* I use the following formal terms: *segments, parts,* and *Sections.* In this analysis, a *segment* is a formal unit that contains single or multiple *chromatic events*. The majority of *chromatic events* occur for the entire duration of a *segment* without interruption. If multiple *chromatic events* occur in a *segment,* they are always layered, never successive. The time-span of a *segment* tends to be five to ten measures long. *Segments* are parsed using the following criteria ordered from most to least important:

- Change in *chromatic event* content
- Change in musical texture
- Change in pitch centricity
- Change in musical character

Table 2.3 contains a two-*segment* excerpt of Appendix B containing *segment 1b* and *segment 1c*. The top three rows of examples excerpted from Appendix B contain the time-span of the *segment* or *segments* included in the excerpt, *segment* ID, and *segment* name. The next ten rows contain the abbreviated names of the ten *CEGs* that occur throughout the composition, and in this table, text reductions of *chromatic events* are provided in the second and third columns. In Appendix B and its excerpted examples, color is a clear indication of *segment* similarity. Table 2.4 shows which colors group similar *segments* in Appendix B and its excerpted examples.

Therefore, Table 2.3 contains the music occurring from measures 6 – 11. This time span is divided into two *segments:*

- *Segment 1b* (*segment* ID), named *Call II* (*segment* name), occurs in measures 6 – 8
- *Segment 1c,* named *Response II*, occurs in measures 9 – 11

In this analysis, *segment* IDs are more frequently used than *segment* names. The number contained in a *segment* ID refers to the *Section* in which the *segment* occurs. Therefore, *segment 1b* must occur in *Section 1*. The letter of a *segment ID* is assigned incrementally with "*a"* representing the first *segment* in a *Section*. *Segments* are named according to their most identifiable characteristic. For instance, change between *chromatic events* from *segment 1b* to *1c* introduces the idea of alternating "call and response" *segments*,

shown in Figure 2.7. Therefore, *segment 1a* is named *Call II* and *segment 1b* is named *Response II*. All "call" *segments* are colored orange and "response" *segments* are colored light navy blue.

Table 2.3 also demonstrates *segment* parsing based on *chromatic event* content. Using Appendix A along with Table 2.3, the six *chromatic events* that occur in *segment 1b* and *1c* can be identified, shown in Figure 2.8:

Segment 1b – measures 6 – 8

- *CE 1c* – a rising chromatic line in the ensemble piano starting on pitch class A, (Figure 2.9)
- *CE 1d* – rising minor second dyads in the solo piano, (Figure 2.10)
- *CE 2b* – solo piano dyads and triads with chromatic connections a result of slides or planning,[8] (Figure 2.11)
- *CE 8b* – a pitch class C, C#, D articulated pedal in the first and second violin and the 'cello, (Figure 2.12)

Segment 1c – measures 9 – 11

- *CE 3a* – a solo piano arpeggiation of PCo 10a starting on pitch class B, (Figure 2.13)
- *CE 4a* – alternating vertical sonorities in the winds, brass, strings, and crotales, (Figure 2.14)

The main justification for parsing *segment 1b* and *1c* is the significant amount of change in *chromatic events* between the *segments*.

[8] Chromatic connections are discussed in depth in Chapter 6.

Parts and *Sections*

Parts are formal units used in this analysis comprised of a single *segment* or multiple *segments*. There are only three distinct types of *parts*: 1) a *Call*, 2) a *Response*, or 3) a *Transition*. The terms "call" and "response" are used somewhat loosely in this context. Musical surface is privileged when parsing and grouping *segments*, but musical function aligns types of *parts*.[9]

A *Call* is a *part* characterized by fast moving, loud, agitated activity and a *Response part* contains slow moving, softer music. Each *Call* contains a unique musical climax that occurs at the end of each *Call*. *Responses* act as resonances for the climactic moments of the *Calls*. *Transitions* connect C*alls* to *Responses* by slowly dissipating climactic moments of each *Call*. Therefore, *Calls*, *Transitions*, and *Responses* are inseparable, resulting in a deeply dependent relationship on the *part* level that does not allow for completely discrete segmentation. Since *parts* are inseparable, a larger formal unit must contain them. That unit is a *Section*. *Sections* must contain a *Call* and *Response* and may contain a *Transition*.

Section 1 – "Call and Response" Building to "Response as Call"

Figure 2.15 shows that *Section 1* consists of the material from measure 1 – 119 and using the descriptions above can be divided into three *parts*:

- *Section 1 Call (S1C) – segments 1a – 1p* – measures 1 – 95
- *Section 1 Transition (S1T) – segment 1q* – measures 96 – 111

[9] For instance, what will be known as *Section 1 Call (S1C)* is comprised of different musical material than *Section 2 Call (S2C)*, but both *parts* have shared characteristics in terms of how they function within *Section 1* and *Section 2*.

- *Section 1 Response (S1R) – segment 1r* – measures 112 – 119

Figure 2.16, a visual representation of the waveform of *Section 1* of a recording of this concerto, further reinforces the parsing on the *part* level. Since waveforms can demonstrate density and amplitude, it is clear that *S1C* consists of louder, more agitated music and that *S1R* is comprised of softer, less active sounds. *S1T* is harder to justify with the waveform representation, but does show a gradual decrease of density from *S1C* to *S1R*. Table 2.5 is a table that contains *segment* ID, *segment* name, and location of each *segment* contained in *Section 1*.

S1C is comprised of alternating "call" and "response" *segments* that expand in length, resulting in a climax in *Call VII*.[10] *Call II* is a definitive example of the musical entities that comprise "call" *segments*. Figure 2.17 contains the score excerpts of *chromatic event 2b* and ensemble responses. Variations of these two musical events combine to produce the dominant musical gestures in *Call II* and all other "call" *segments* in *Section 1*. The piano dyads of *CE 2b* are answered by a variety of sustained ensemble chords. The relationship between the attack of *CE 2b* and resonance of the sustained ensemble chords demonstrates that "call and response" is present on a gestural level. Even though *CE1c* and *CE 2b* are varied, the "call and response" relationship remains consistent from *Call I* to *Call VI*.

Call II is answered by *Response II*, which contains: *CE 3a* and *CE 4a*, shown in Figure 2.18. All "response" *segments* in *Section 1* contain variations of *CE 3a* and *CE 4a*. *CEG 3* only contains variations of *CE 3a*, but *CEG 4* contains more varied *chromatic events*. Therefore, a further way to parse *CEGs* is needed: a *CE* sub-group. A *CE* sub-

[10] *Call I and Response I* is understood as a self-contained "call and response" where the first "response" is silence.

group contains musically related *chromatic events* within a *CEG*. All sub-groups are named by the first instance of a *chromatic event* included in the sub-group. Therefore, *CE 4a* is contained in the *CE 4a* sub-group. The other events in the *CE 4a* sub-group include: *CE 4b, 4c, 4d, 4e,* and *4g*. The first measures of all *chromatic events* in the *CE 4a* sub-group are shown in Figure 2.19. *Chromatic events* contained in both the *CE* sub-groups and *CEG 3* transform over the course of the composition. The first *chromatic event* of a *CE* sub-group or *CEG* containing one type of musical gesture is usually the most varied instance. Appendix D contains text reductions of all of the *CE* sub-groups and *chromatic events* contained within.

"Call and Response" is present on a gestural level in *CE 3a* and *CE 4a*, but manifests more abstractly than *CE 1c* and *CE 2b* shown in Figure 2.20. The lower notes of *CE 3a* represent "calls" answered by the range ascent of the arpeggios. *CE 4a* alternates between two vertical sonorities: a "call" chord and a "response" chord. Similar to *CE 1c* and 2b, the "call and response" qualities of *CE 3a* and *CE 4a* remain consistent even though the *chromatic events* in *CEG 3* and the *CE 4a* sub-groups are varied.

Transformation of solo piano *chromatic events* in the "call" *segments* provides the catalyst for change in *Section* 1, since the variation of *chromatic events* in the "response" *segments*, for a number of reasons that will be demonstrated in Chapter 6, results in a degree of stasis. The composition begins with *CE 2a,* Figure 2.21. This *chromatic event* contains short, sharp notes in the solo piano its lowest register. *CE 2a* is the first instance of the *CE 2a* sub-group that contains the following *chromatic events: CE 2a, 2b, 2c, 2d, 2e, 2f, 2g, 2h, 2i,* and *2j*. Examination of all of these events shows the transformation that occurs over the course of *Section 1 Call*. These dyads slowly expand in range, rise in

tessitura, increase in voice density (move from dyads to trichords, and more) and increase in rhythmic frequency during the "call" *segments*. The transformation of the *CE 2a* sub-group is clearly shown by comparing the first *chromatic event* to the last – Figure 2.22: *CE 2a* and *CE 2f* from *segment 1j*.

The rise in tessitura and increase in voice and rhythmic density has a twofold effect on the form of *Section 1*. First, the transformations contribute to the solo piano gestures achieving a distinct identity from the ensemble piano part. The ensemble piano part contains the *CE 1a* sub-group, demonstrated above in *CE 1c*. Each *chromatic event* within the *CE 1a* sub-group is comprised of chromatic ascents that occur in each of the "call" *segments*. The *CE 1a* sub-group does not rise in range and functions as a pedal out of which the *CE 2a* sub-group emerges due to its rise in tessitura, shown in Figure 2.23. Figure 2.24, which contains *CE 2k* and the ensemble parts of *segment 1j*, illustrates the second effect of the rise in tessitura and density: the solo piano starts to encroach on the register of the ensemble resonance. This encroachment, coupled with the detachment from the ensemble piano, results in a ripple effect of changing roles throughout the ensemble. The ensemble, pushed out by the solo piano transformation, abandons its resonant role in *Varied Call I*; instead, it presents material pre-referential to *Section 2* and *Section 3*. The ensemble piano, no longer functioning as a pedal for the solo piano, changes function in *Varied Response I* by imitating the solo piano material, shown in Figure 2.25.

These role changes mark the beginning of an ensemble, ensemble piano, and solo piano effort to realize the climax of *Section 1*, *Call VII*. *Call VII* is not the loudest, or most active *segment* in *Section 1*, but is in fact the climax. This *segment* features the

reconciliation of the ensemble resonance and piano attacks. The reconciliation is a result of two processes: role reversal of gestural "call and response" and reduction of density in the solo piano. Role reversal occurs when the ensemble resonance occurs before the piano punctuation in *Call VII*, reversing the order and role of the "calls and responses" excerpted as Figure 2.26. When the piano attacks occur as the "calls", they force the resonances into a subservient role, but since that is reversed here, the piano attacks and ensemble resonances have a more equalized relationship in *Call VII.* Additionally, the reduction of rhythmic density in the solo piano music allows for longer and more pronounced resonance to the response (now "call") gestures, resulting in the most musically agreeable gestural "call and response", as "response as call", between the piano and the ensemble in *Section 1*,

Transition I dissipates the climactic energy of *Call VII* with two *chromatic events*: *CE 4hi,* an E2 overtone-based chromatic descent and *CE 2k,* angular chromatic chords in the solo and ensemble piano. *CE 2k* is not quite as dense in terms of sonority occurrence as the other events in the *CE 2a* sub-group. The reduction of density amplifies transitional function *CE 2k* projects a sense of unwinding compared to other *chromatic events* in the *CE 2a* sub-group. Descent is a traditional tool used to project transitory character throughout the history of music, and *CE 4h* is no exception. *CE 4h* is an overlapping descent that effectively results in a chain of suspension-like relationships, which can also be seen as an abstract "call and response".

In fact, any stepwise ascent or descent can be viewed as a "call and response" chain where the response becomes the "call" for the next ascending note, demonstrated in Figure 2.6. Since *CE 4h* and *CE 2k* enable a transitional function, *segment 1q, Transition*

I, is classified as *Transition* on the *part* level: *Section 1 Transition (S1T).* It is followed by *segment 1r* that contains *CE 4i*, repeated chords based off the overtone series of C0. The chords contained in *CE 4i* exhibit yet another manifestation of "call and response", shown in Figure 2.27. Alternating sonorities comprise *CE 4i*, the first being a "call" and the second acting as a "response." These chords occur in the wake of *S1C,* so *segment 1r* embodies all of the characteristics of a *Response part*:

- It occurs after a *Call part*, or a *Transition part*
- It contains softer, slow moving music
- It functions as the resonance of a *Call part*

Therefore, *segment 1r* is *Section 1 Response (S1R).*

<u>*Section 2* - Arpeggios, a False Climax, a Perpetual Mensuration Canon</u>

Figure 2.28 shows that *Section 2* consists of the material from measures 120 – 295 and is divided into three *parts*:

- *Section 2 Call (S2C) – segments 2a – 2p* – measures 120 – 235
- *Section 2 Transition (S2T) – segment 2q* – measures 236 – 245
- *Section 2 Response (S2R) – segment 2r* – measures 246 – 295

Active solo piano arpeggios, *CE 7f,* occur in *segment 2a, Arpeggio I*, excerpted in Figure 2.29. The tumultuous quality of *CE 7f* announces the beginning of *Section 2 Call* by immediately displacing the stability of *S1R.*[11] *CE 7f* sub-group arpeggios contain a chromatic ascent through *Arpeggio VII*, occasionally contrasted with slight pullbacks or descents, like *Octaves I*. The relationship between *Arpeggio I*, *II,* and *Octaves I*

[11] Table 2.6 contains *segment* names for *Section 2*

embodies a more abstract version of "call and response" than the literal exploration of *Section 1 Call*, shown in Figure 2.30. On a gestural level, "call and response" is further abstracted to the fundamental principle of "call and response": cause and effect. An example of the "call and response" abstraction is contained in *Arpeggio V* and *Arpeggio VII.* These *segments* contain the first overt melodic presentations of the chromatic scale in the composition, *CE 1q* and *CE 1r*. The arpeggiated pedal functions as the "call" and the chromatic ascents are the "response".

The ensemble reacts to the *segment*-to-*segment* chromatic ascent planing of the *CE 7f* sub-group by moving with it, against it, or providing a pedal through *Arpeggio VII*. The solo piano presents new material in *Piano Ascent I*, signaling the beginning of the combined effort of the soloist and the ensemble to realize the climactic moment of *Section 1, High Piano Chords I*, shown in Figure 2.31. The insistent musical material in *Fanfare II* frustrates the climax of *Section 1*. *Transition II* follows *Fanfare II* and contains *CE 2l* contains a varied version of *CE 2k* from *Transition I.* The kaleidoscopic quality of *CE 2l* combined with the chromatic ascent of *CE 5g* results in the transitional function of *Transition II,* shown in Figure 2.32.

Section 2 Response is comprised of one segment, *Mensuration Canon,* or *segment 2r*. *Segment 2r* contains *CE 2r* that consists of two ascending chromatic scales starting on different pitches that move at different rates of speed, shown in Figure 2.33. One scale ascends every seven sixteenth notes while the other ascends every nine. "Call and response" is more literal in *S2R* as the first ascent constitutes the "call" and the second qualifies as the "response". These ascents are varied by octave displacement, harmonization, range, and dynamics in order to realize various climaxes. The climactic

moments in *CE 2r* are based on simultaneities resulting from rhythmic unisons that occur as a result of the construction of this two-voice canon. An ensemble pedal, *CE 9o,* constantly recontextualizes the ascents and the climaxes occurring in the canons, and even functions as a "response" to one of the climactic "calls", shown in Figure 2.34. The canons are truncated when the faster moving ascent arrives on C8 functioning as a pedal waiting for the second ascent to catch up, projecting a clear chromatic rise against the C8, shown in Figure 2.35. At the very last moment, the second voice in the canon converges on the high C8 pedal for a brief moment before it nudges back down to B7. Moving back down to B7 gives the impression that the process will continue in reverse; however, the response is immediately interrupted by the percussion instruments that signal the opening of *S3C*.

Section 3 - Reverse Fanfare, Repetition, True Climax, and Final Descent

Figure 2.36 shows that *Section 1* consists of the material from measure 296 – 419 and can be divided into two *parts*:

- *Section 3 Call (S3C) – segments 3a – 3h* – measures 296 – 354
- *Section 3 Response (S3R) – segment 3i – 3j* – measures 355 – 420

The ensemble material that opens *Section 3* resembles *Fanfare I* and *Fanfare II* but played in reverse, while the solo piano plays abstracted reversed versions of *Piano Ascent I* and *Piano Clusters I* in measure 296 and 297, shown in Figure 2.37.[12] In measure 298, the solo piano, constantly in conflict with the ensemble, attempts to play a sustained pitch followed by the same gesture in the ensemble piano, shown in Figure

[12] Table 2.7 Contains *segment* names for *Section 3*.

2.38. This bizarre moment is an irreverent take on the "calls and responses" in *Section 1* and provides the impetus for musical variation in *Repeated Structures. Repeated Structures* projects a developmental character through freely varied material and tight rhythmic integration between the solo piano and the ensemble, functioning as the delayed climax of *S1C*, relegating *Call VII* to the status of a false climax.

The free development of *Repeated Structures* allows for *Hammered Chords* to introduce a new musical idea consisting of violently hammered chords in the highest octave of the solo piano, shown in Figure 2.39. The ensemble rhythmically integrates with these chords, resulting in a mostly homorhythmic orchestrated piano sound mass, shown in Figure 2.40. After *Hammered Chords*, material from *Section 2* returns. The climax of *S2C* recurs in *High Piano Chords II*, but instead of this material functioning as the climax, the composition proceeds through this material to *Fanfare IV*, the climactic moment of the composition, shown in Figure 2.41. In *segment 3h*, the ensemble sustains powerful chords answered by hammered chords in the solo piano, again demonstrating "call and response." The climax is forcefully truncated by a stepwise descent beginning with pitch class Bb in the brass in measure 354, shown in Figure 2.42. The texture quickly pulls back in volume as the ensemble continues to descend by step. For the remainder of the composition, the solo piano continues to hammer away periodically, creating an articulated forceful pedal. The hammered chords and the soft ensemble descent represent opposition between the ensemble and the piano. The stepwise ensemble descent is continued as a chromatic descent by the ensemble piano in *Descent II*, shown in Figure 2.43. Like *Mensuration Canon*, the descent is accompanied by noise or noise-based ostinati or intermittent soft recurring gestures in the ensemble. The

composition concludes with a final "call and response" of pitch class C to pitch class B, shown in Figure 2.44.

Summary

High-level segmentation of Furrer's concerto highlights certain aspects of the composition best summarized as broad observations. Each *Section* contains interdependent *parts* that realize unique climaxes. The long-term balance of these climaxes is carefully measured, allowing for a compositional climax in *S3C*. The compositional climax in *Section 3 Call* establishes the concerto as a clearly teleological composition. Additionally, since *S2C* and *S3C* realize unique climaxes, these *Sections* use *segments* in different ways to achieve different goals. The music presented first in each of the three *Call parts* musically identifies each *Call*. The very same material contributes towards realizing the climax of each *Section*. *Transitions* contain related material that winds the *Calls* down to the *Responses.* All the *Responses* contain quiet and sustained music. Finally, *parts* and *segments* share a considerable number of varied *chromatic events*, making transformation of *chromatic events* a key formal determinant for this concerto.

"Call and Response" Loops

The above analysis demonstrates that "call and response" is present on three formal levels:

- A gestural level, as the short dyads of the *CE 2a* sub-group resulting in ensemble responses

- From *segment*-to-*segment*, with *Call II* followed by *Response II* in *Section I*
- On a *part* level, with *S1C* followed by *S1R*, *S2C* followed by *S2R*, and *S3C* followed by *S3C*

It can then be argued that nested "calls and responses" occur at different rates of speed throughout the composition. Figure 2.45 demonstrates the nesting of "call and response" in *Section 1* on the levels of the gesture, *segment*, and *part*.

The thesis of this paper is that in this concerto, identity is obtained through iterative looping. "Call and response" is, in this composition, a recursive, nested loop. Its use changes as the composition changes. The clearest example of "call and response" transformation is the "call and response" inversion that occurs at the climax of *S1C*. Piano chords instigate ensemble responses in *Call segments* in *Section 1 Call*. *CE 2b* and its ensemble response are shown in Figure 2.17. The climax of *S1C* reverses the order of the "call and response" between the piano chords and the ensemble, shown in Figure 2.26, containing *CE 2j* and its ensemble response. Switching "response" to "call" demonstrates that changing use of the "call and response" loop allows for *S1C* to realize a climactic moment, which in turn defines the identity of *S1C*. Therefore, transformation of the "call and response" loop itself results in transformation of *chromatic events* it contains, based on need. The transformation of *chromatic events* results in unique gestural identity that contributes to *segment* identity and *Section* identity.

Since each *Section* realizes its own unique climax and contains a full "call and response" on the *part* level, the composition consists of three dependent iterations of "call and response" loops. *Section 1*, the first iteration, conveys a more literal sense of "call and response," as the *segment*-to-*segment* form of *Section 1 Call* is "call and response."

Despite the drastic change of surface material from *Section 1* to *Section 2*, "call and response" is still present in *Section 2* but explored in a more abstract and playful manner. The climax of *Section 2* contains "call and response" chords between the ensemble piano and the solo piano, but the "calls" contain the same pitch material as the "responses," showing an irreverent attitude towards "call and response," shown in Figure 2.31. *Section 3* utilizes the climax of *Section 1* and material from *Section 2* to drive towards the climax of the composition, which is a "call and response."

The different relationship each "call and response" loop has with "call and response" puts in motion a progression of identity building: introduction, use, and refinement. *Section 1* introduces the idea of "call and response" while *Section 2* uses the idea of "call and response" and *Section 3* refines the idea of "call and response" and realizes the climax of the composition with a very traditional "call and response," shown in Figure 2.41. In the case of teleological compositions, clear climactic moments are critical for establishing a compositional identity. These "call and response" loops, in conjunction with devices that will be illustrated in following chapters, transform and contribute to the ability of this composition to self-identify using iterative loops.

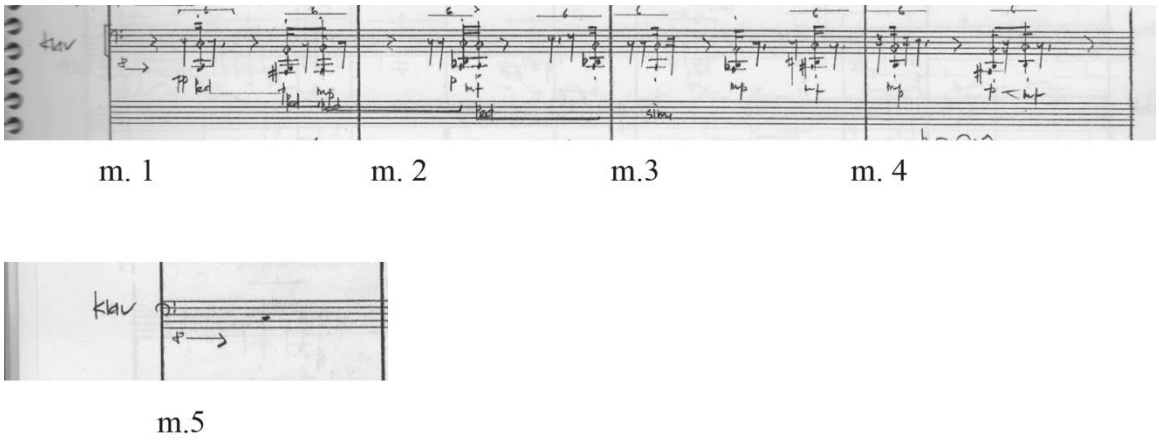


Figure 2.1: *CE 1a* – Ensemble piano from mm. 1 – 5 of Beat Furrer's *Konzert für Klavier und Orchester*

Table 2.1: *Segment 1a* from Beat Furrer's *Konzert für Klavier und Orchester*

mm.	1 2 3 4 | 5
Segment	1a
Name	Call I and Response I
CEG1 PnoChrom	a. T, E, 0, 1, 2 b. [TE0], [E01], [01], [012], [12]
CEG2 ChromConn	a. Slide/Plane Dyads and Triads
CEG3 TripletPnoArp	
CEG4 15Sust	
CEG5 EnsChrom	
CEG6 32Ost	
CEG7 PnoPed	
CEG8 ArtPed	a. [012]
CEG9 SusPed	
CEG10 MovPed	

Table 2.2: *Segment 2k* from Beat Furrer's *Konzer für Klavier und Orchester*

mm.	182	183	184	185	186	187	188	189	190	191	192
Segment	2k										
Name	Piano Ascent I										
CEG4 15Sust	m.	Chromatic Connections									
CEG5 EnsChrom	f.	{4, 5, 6, 7, 8, 9} - M3 Gliss. up then m3 Gliss. down									
	e.	[T4], [E5], [06], [17], [28], [39], [4T], [50], [61] w/ [E4], [T3], [93], [82], [71], [60], [5E], [4T], [39] Lower Voice Descent									
CEG6 32Ost	h./i.	PCo 1 15-note Ostinato/PCo 5 13-note Ostinato T0 - TE									
	j.	PCo 6 - 9-note Ostinato in winds									
	k.	PCo 6 - 9-note Ostinato in strings varied m. 187									
CEG7 PnoPed											
CEG8 ArtPed											
CEG9 SusPed											
CEG10 MovPed											

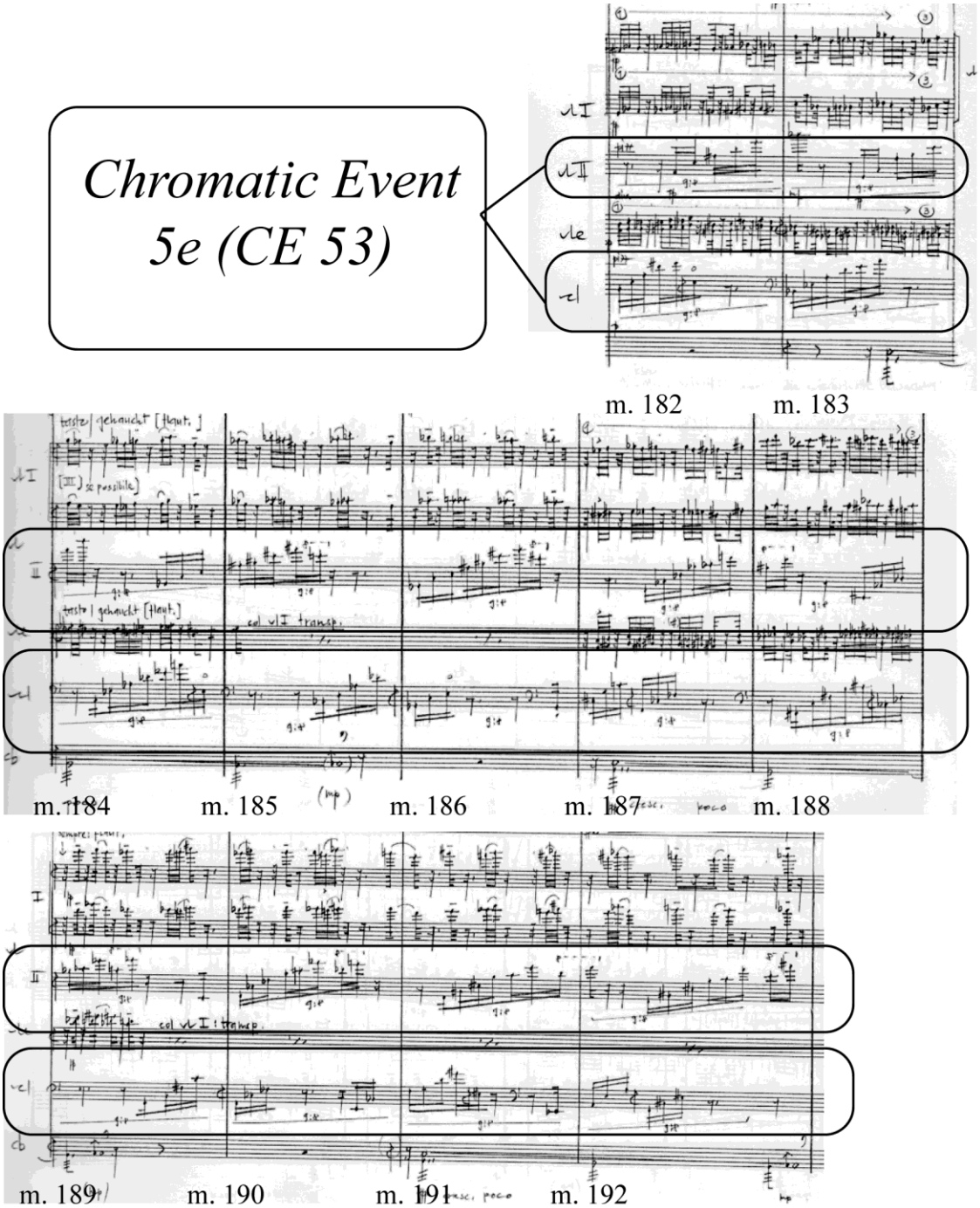


Figure 2.2: *CE 5e* – String arpeggiation with outer voice chromatic ascent and descent in Beat Furrer's *Konzert für Klavier und Orchester*

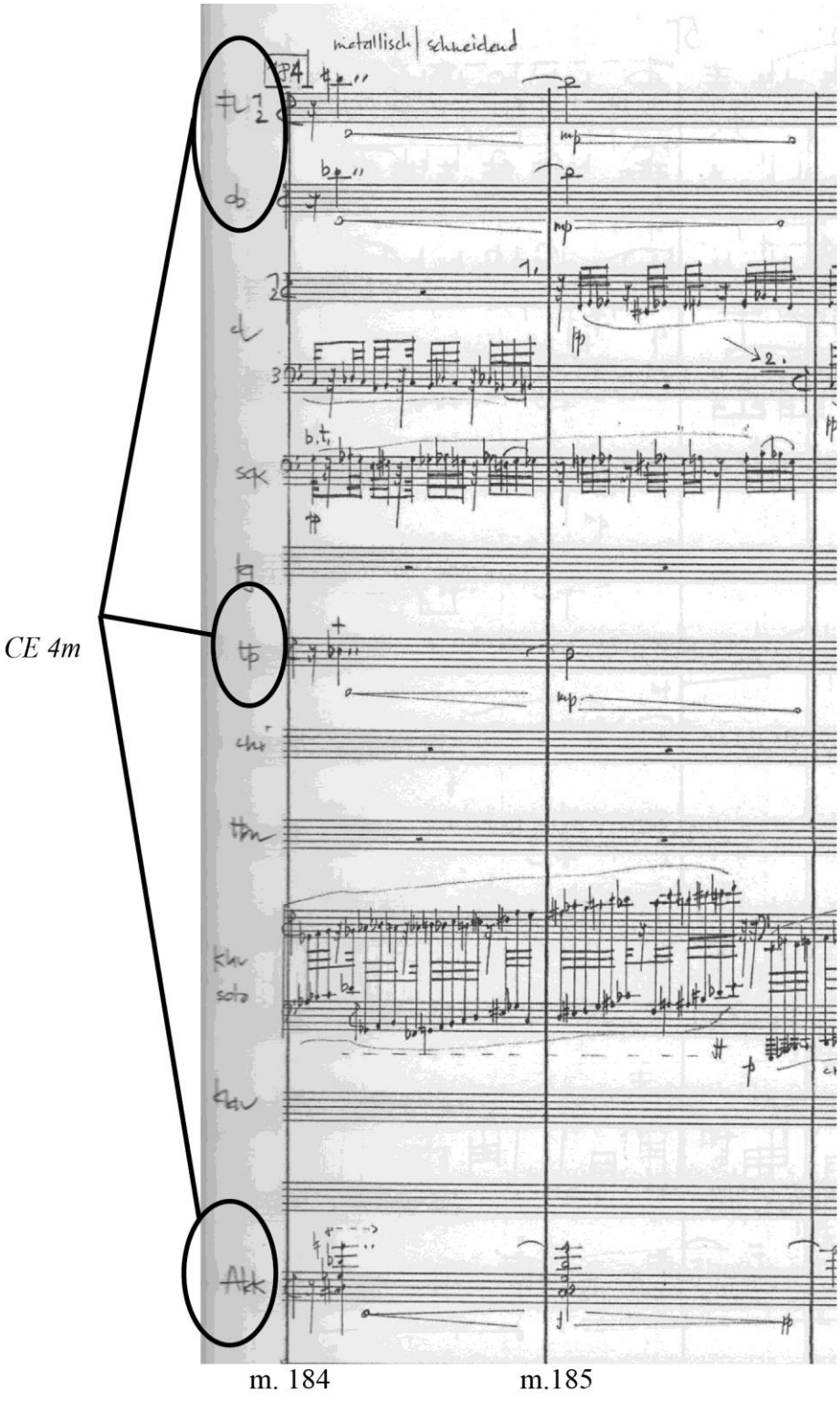


Figure 2.3: *CE 4m* – First measure of flute, oboe, trumpet, accordion 15-beat sustained chords in *segment 2k* of Beat Furrer's *Konzert für Klavier und Orchester*

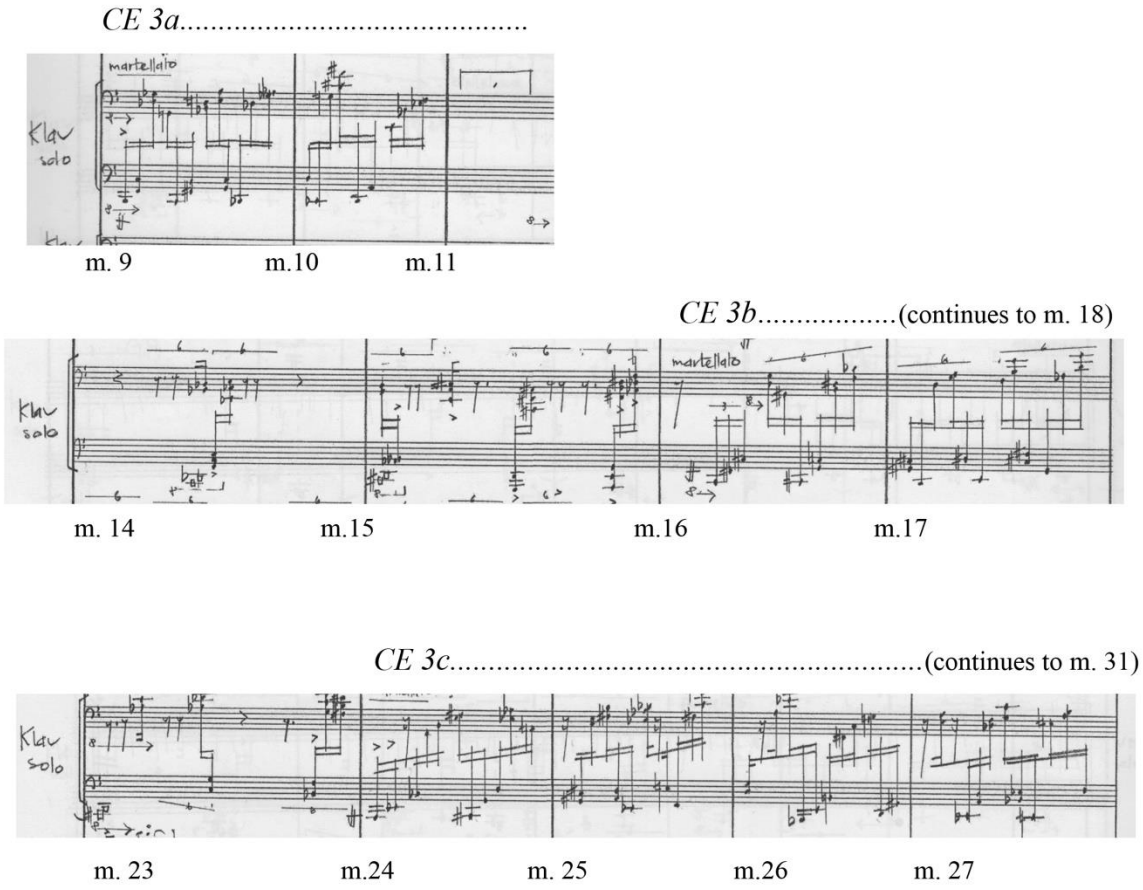
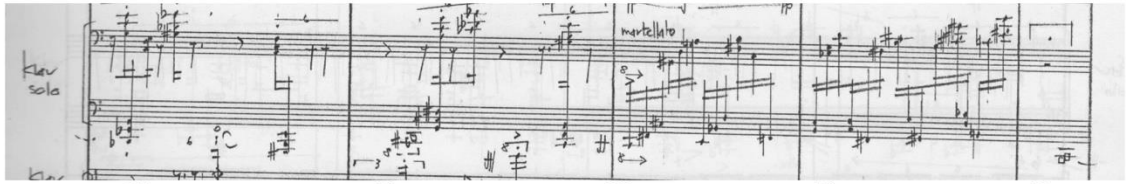


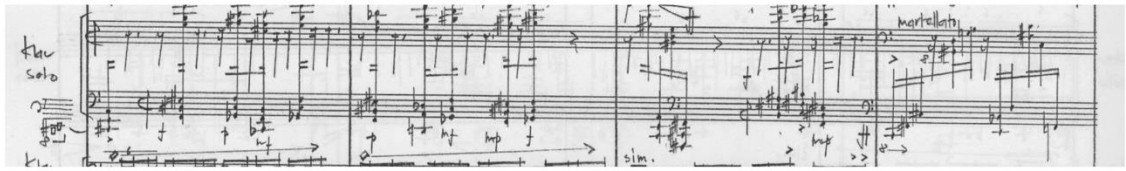
Figure 2.4: First measures of all *chromatic events* contained in *Chromatic Event Group 3* in Beat Furrer's *Konzert für Klavier und Orchester*

CE 3d.....



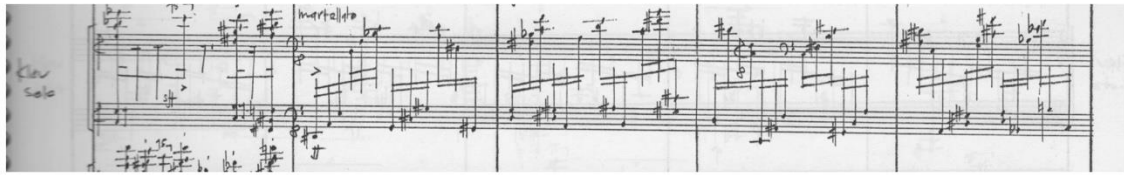
m. 37 m. 38 m. 39 m.40 m. 41

CE 3e...(continues to m. 62)



m. 50 m. 51 m. 52 m. 53

CE 3f.....(continues to m. 83)



m. 74 m. 75 m. 76 m. 77 m.78

Figure 2.4 (Continued)

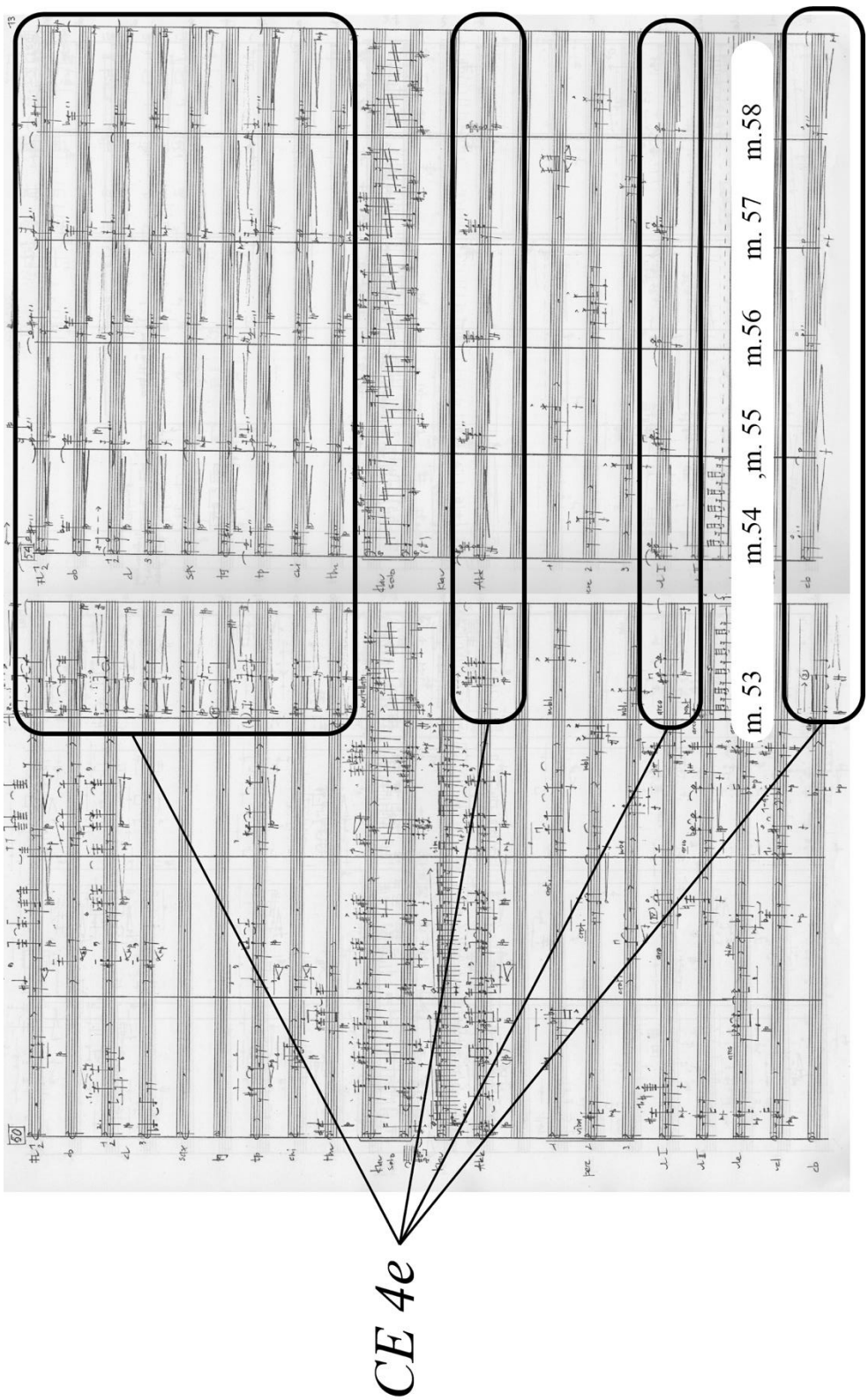


Figure 2.5: First measures of *CE 4e* – two vertical sonorities in the winds, brass, bass, accordion in *Segment 1k* of Beat Furrer's *Konzert für Klavier und Orchester* (*CE 4e* continues through m. 62)

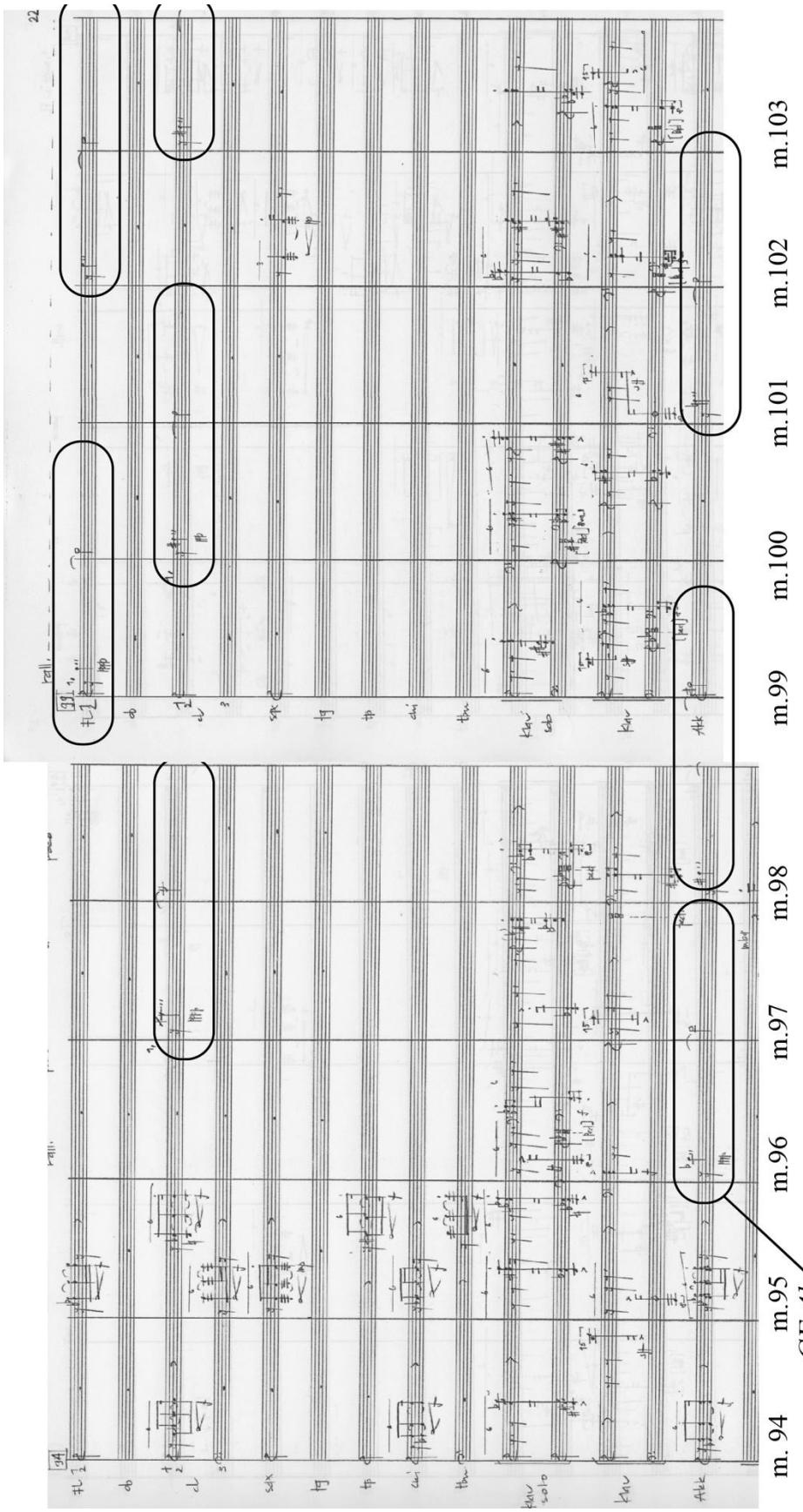


Figure 2.6: *CE 4h* in *segment 1q* of Beat Furrer's *Konzert für Klavier und Orchester*

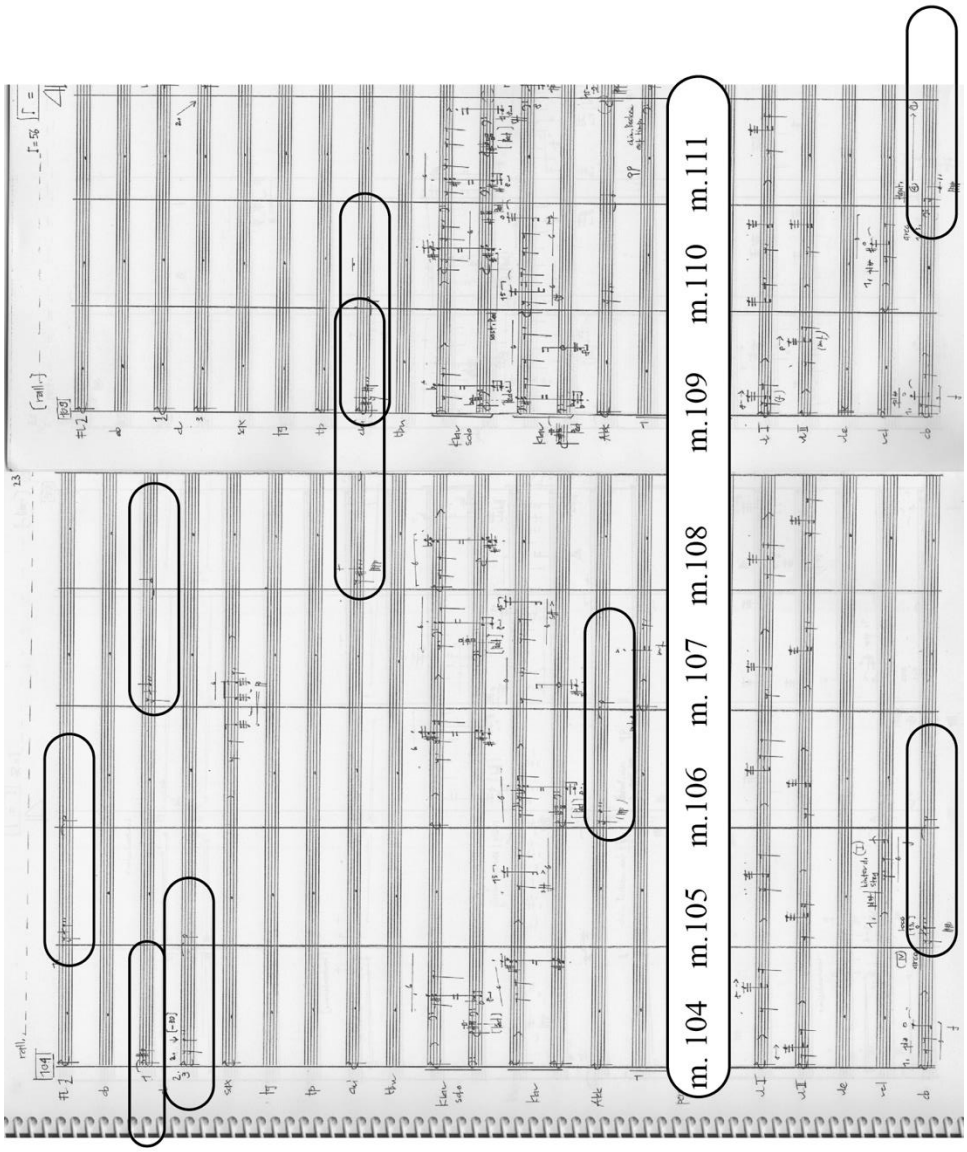


Figure 2.6 (Continued)

Table 2.3: *Segments 1a* and *1b* from Beat Furrer's *Konzert für Klavier und Orchester*

mm.	6	7	8	9	10	11
Segment	1b			1c		
Name	Call II			Response II		
CEG1 PnoChrom	c. 9, T, E, 0, 1 d. [9T], [E0], [12]					
CEG2 ChromConn	b. S/P Dyads and Triads					
CEG3 TripletPnoArp				a. TE – PCo 10a		
CEG4 15Sust				a. [234589TE] [0167]		
CEG5 EnsChrom						
CEG6 32Ost						
CEG7 PnoPed						
CEG8 ArtPed	b. [012]					
CEG9 SusPed						
CEG10 MovPed						

Table 2.4: *Segment* similiarity color code for Appendix B and Figures excerpted from Appendix B

Color	*Segment* Groups	*Section*	Unique
	Call + Response	1	Yes
	Call	1	No
	Response	1	No
	Transition	1, 2	No
	Section Response	1, 2, 3	No
	Arpeggio	2	No
	Octaves	2, 3	No
	Arpeggio w/Ascent	2	No
	Rising Arpeggio	2	No
	Piano Ascent	2, 3	No
	Fanfare	2, 3	No
	Solo Piano Clusters	2	Yes
	Double Piano Clusters	2, 3	No
	High Piano Chords	2, 3	No
	Repeated Structures	3	Yes
	Hammered Chords	3	Yes

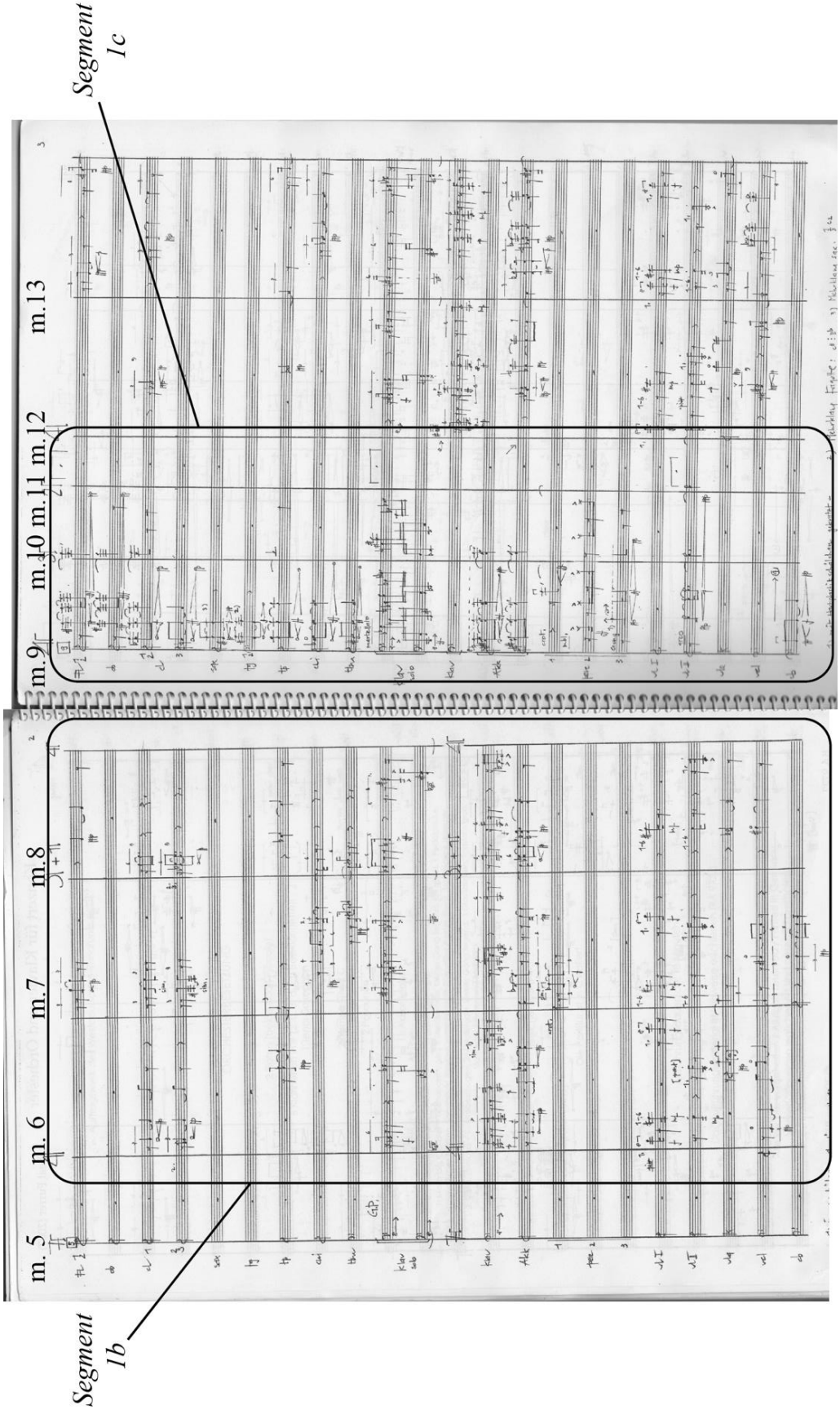


Figure 2.7: *Segments 1b* and *1c* from Beat Furrer's *Konzert für Klavier und Orchester*

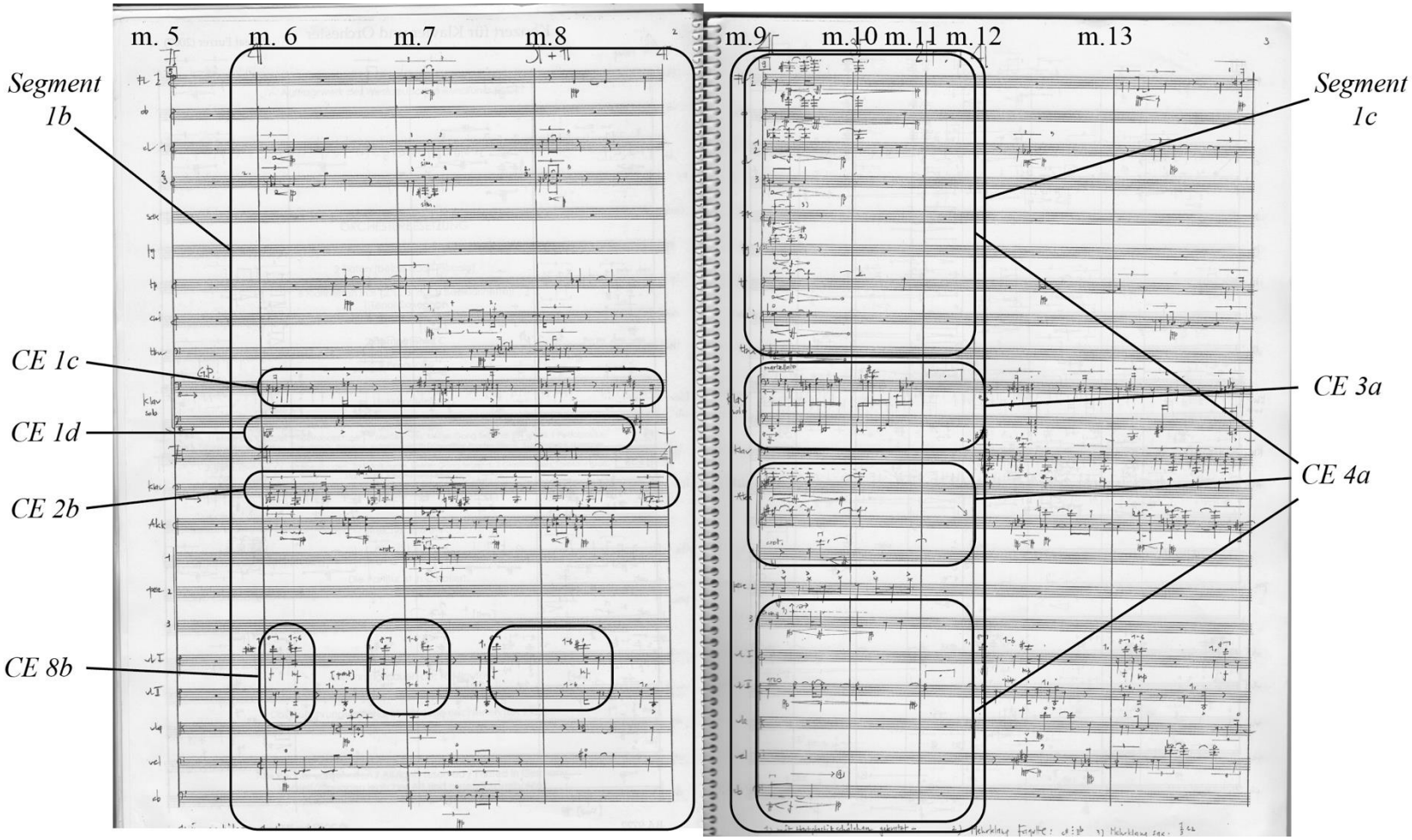


Figure 2.8: Six *chromatic events* contained in *segments 1b* and *1c* of Beat Furrer's *Konzert für Klavier und Orchester*

CE 1c.....

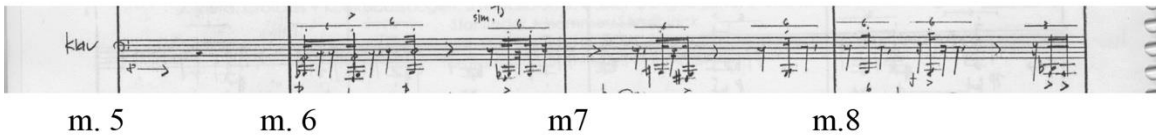


Figure 2.9: *CE 1c* in *segment 1b* of Beat Furrer's *Konzer für Klavier und Orchester*

CE 1d.....

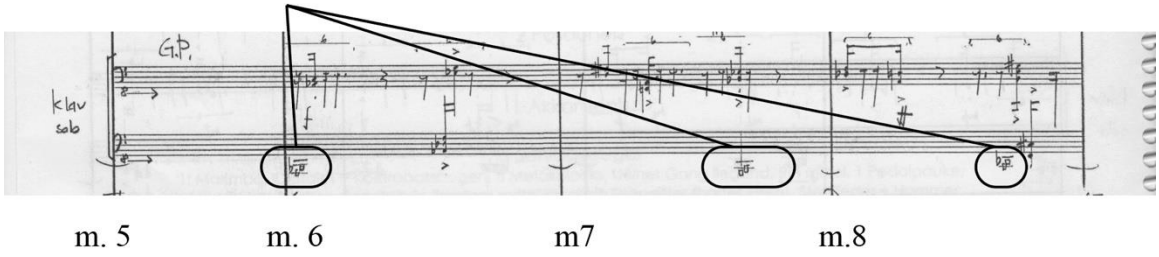


Figure 2.10: *CE 1d* f in *segment 1b* of Beat Furrer's *Konzer für Klavier und Orchester*

CE 2b.....

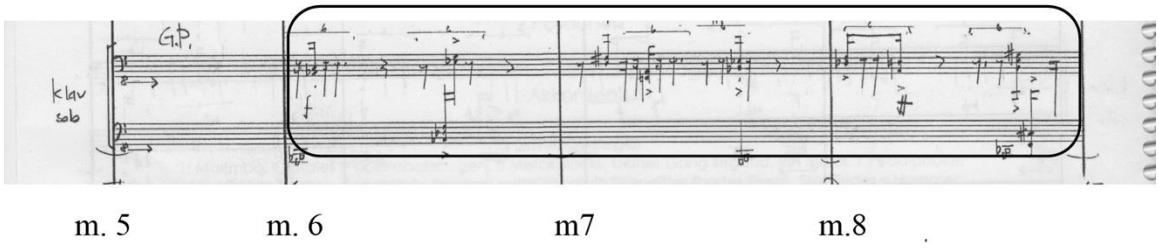


Figure 2.11: *CE2b* in s*egment 1b* of Beat Furrer's *Konzer für Klavier und Orchester*

CE 8b.....

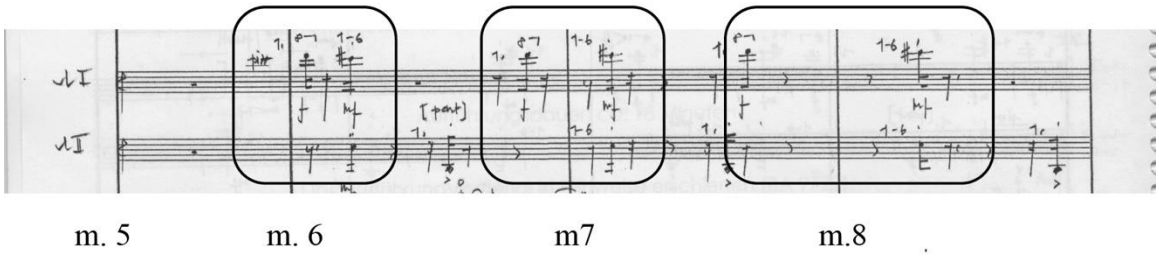


Figure 2.12: *CE 8b* in s*egment 1b* of Beat Furrer's *Konzer für Klavier und Orchester*

CE 3a

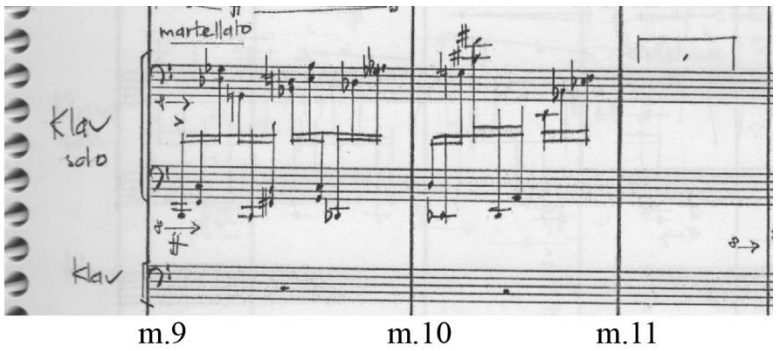


Figure 2.13: *CE 3a* in s*egment 1c* of Beat Furrer's *Konzer für Klavier und Orchester*

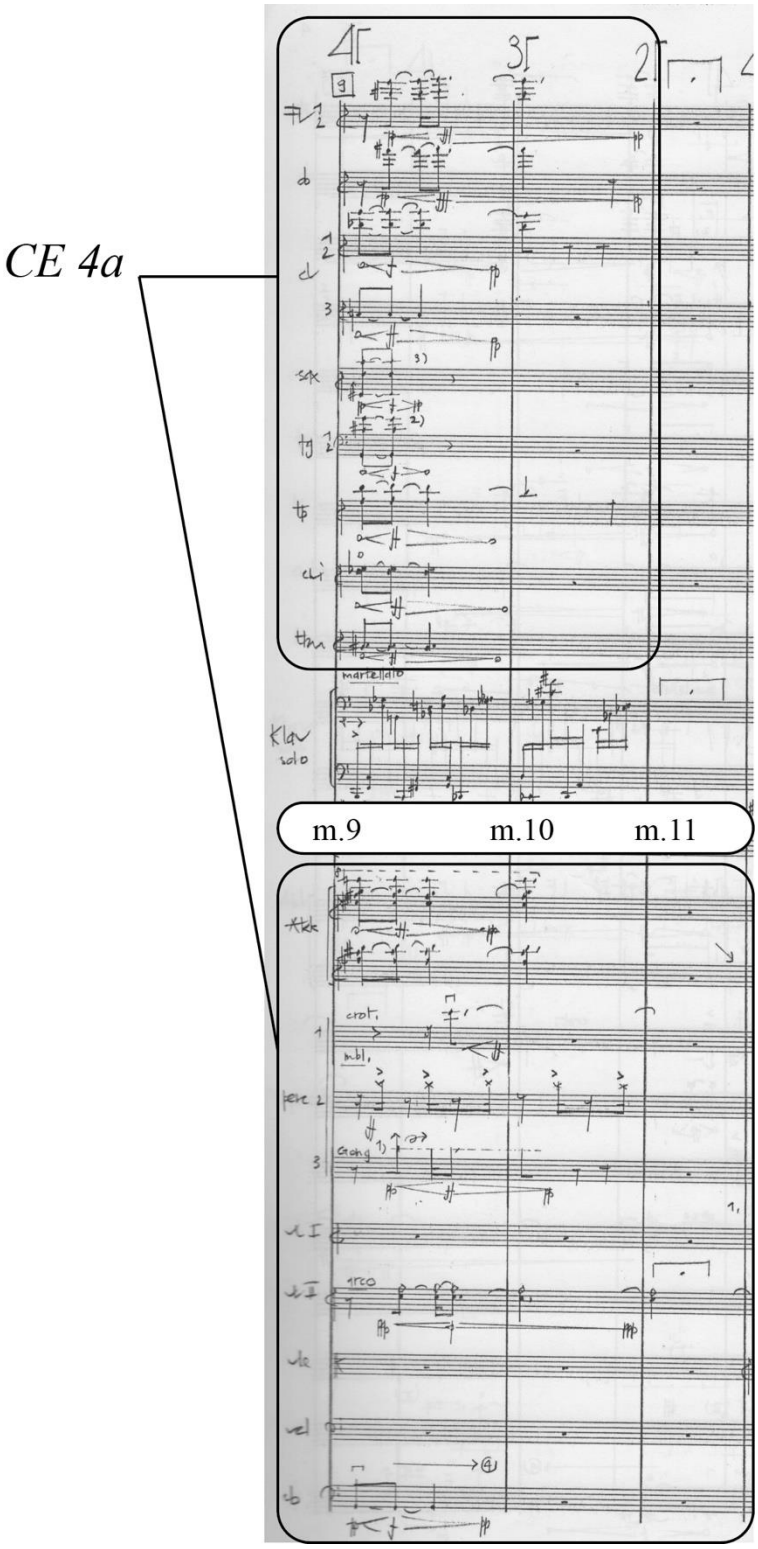


Figure 2.14: *CE 4a* in s*egment 1b* of Beat Furrer's *Konzer für Klavier und Orchester*

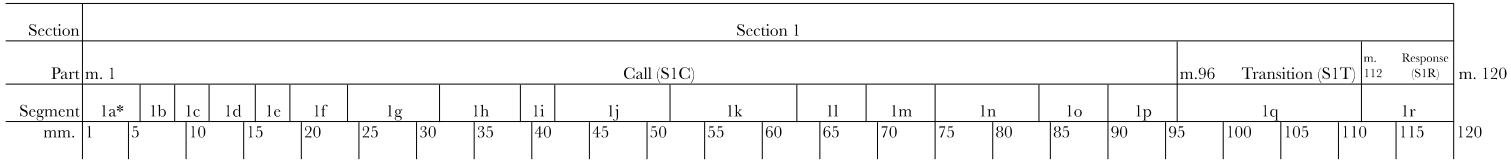


Figure 2.15: Formal parsing of *Section 1* of Beat Furrer's *Konzert für Klavier und Orchester*

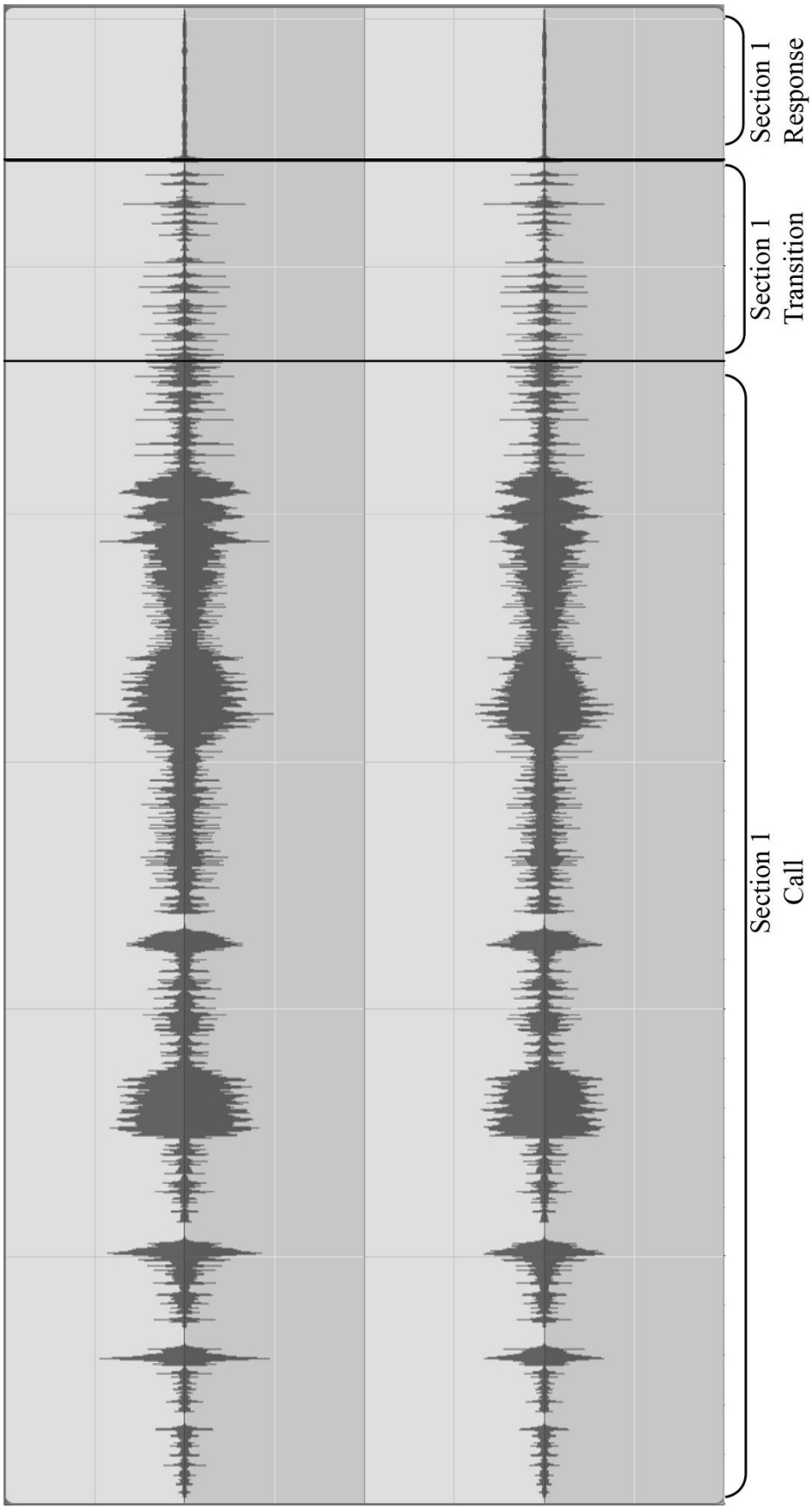


Figure 2.16: Audio waveform of *Section 1* of Beat Furrer's *Konzert für Klavier und Orchester*

Table 2.5: *Segment* ID, name, and location for *segments* contained in *Section 1* of Beat Furrer's *Konzert für Klavier und Orchester*

ID	Descriptive Name	mm.
1a	Call I and Response I	1 – 5
1b	Call II	6 – 8
1c	Response II	9 – 11
1d	Call III	12 – 15
1e	Response III	16 – 18
1f	Call IV	19 – 23
1g	Response IV	24 – 31
1h	Call V	32 – 38
1i	Response V	39 – 41
1j	Call VI	42 – 52
1k	Response VI	53 – 62
1l	Varied Call I	63 – 68
1m	Varied Response I	69 – 74
1n	Response VII	75 – 83
1o	Varied Call II	84 – 89
1p	Call VII	90 – 95
1q	Transition I	96 – 111
1r	Arrival	112 – 119

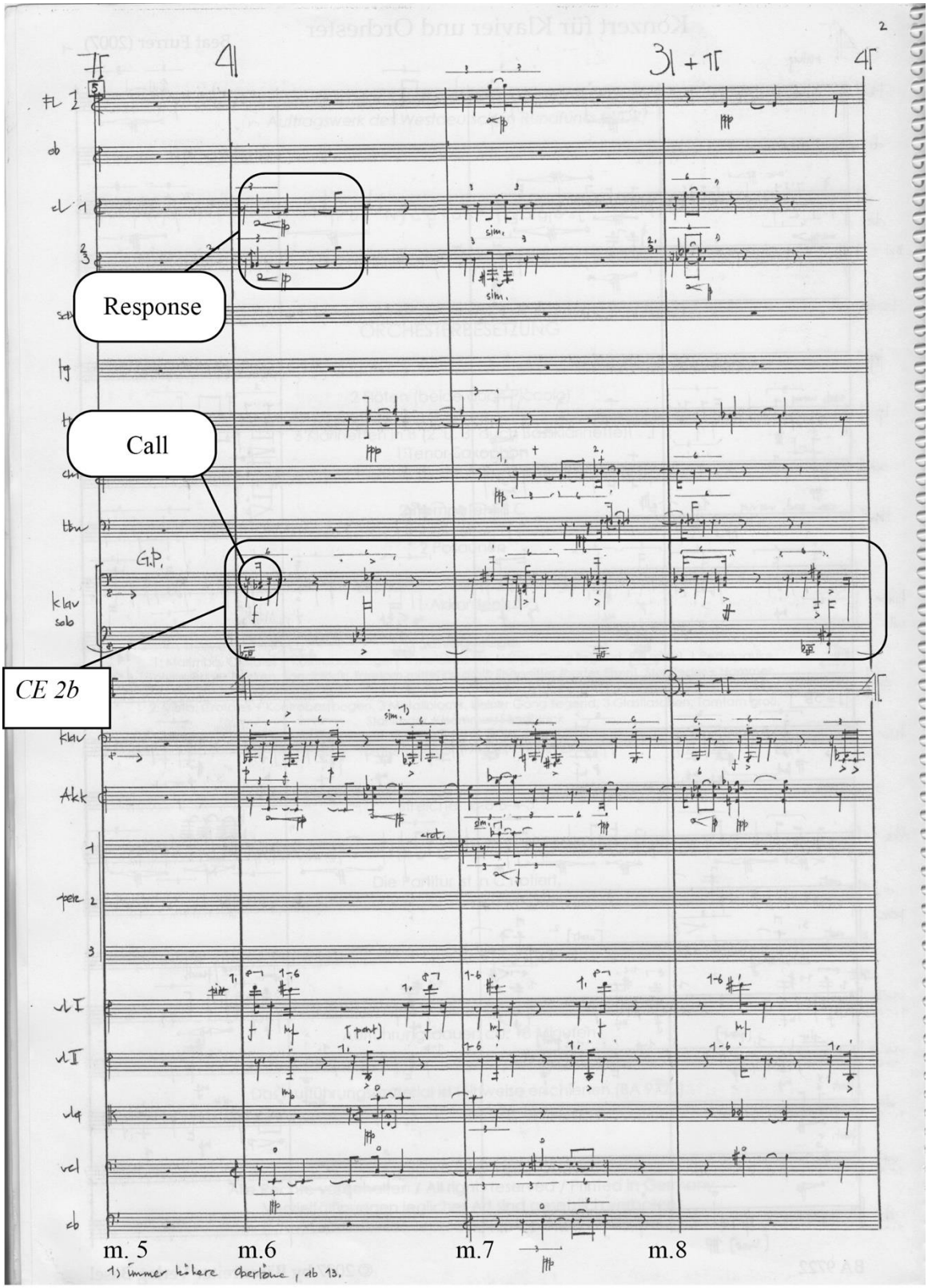


Figure 2.17: Call and response between *CE 2d* and the ensemble in *segment 1b* of Beat Furrer's *Konzert für Klavier und Orchester*

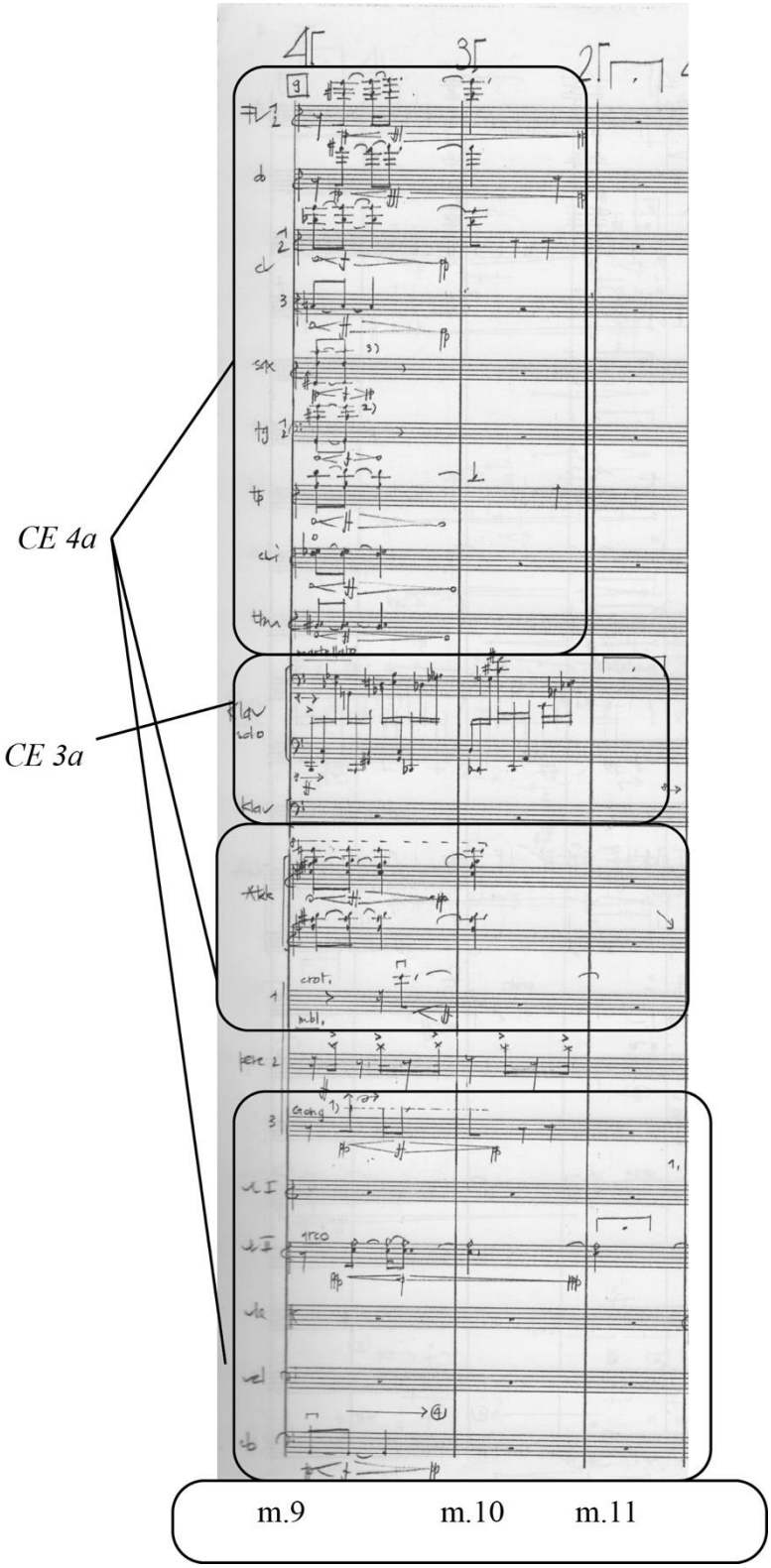


Figure 2.18: *CE 4a* and *CE 2d* in *segment 1b* of Beat Furrer's *Konzert für Klavier und Orchester*

CE 4a

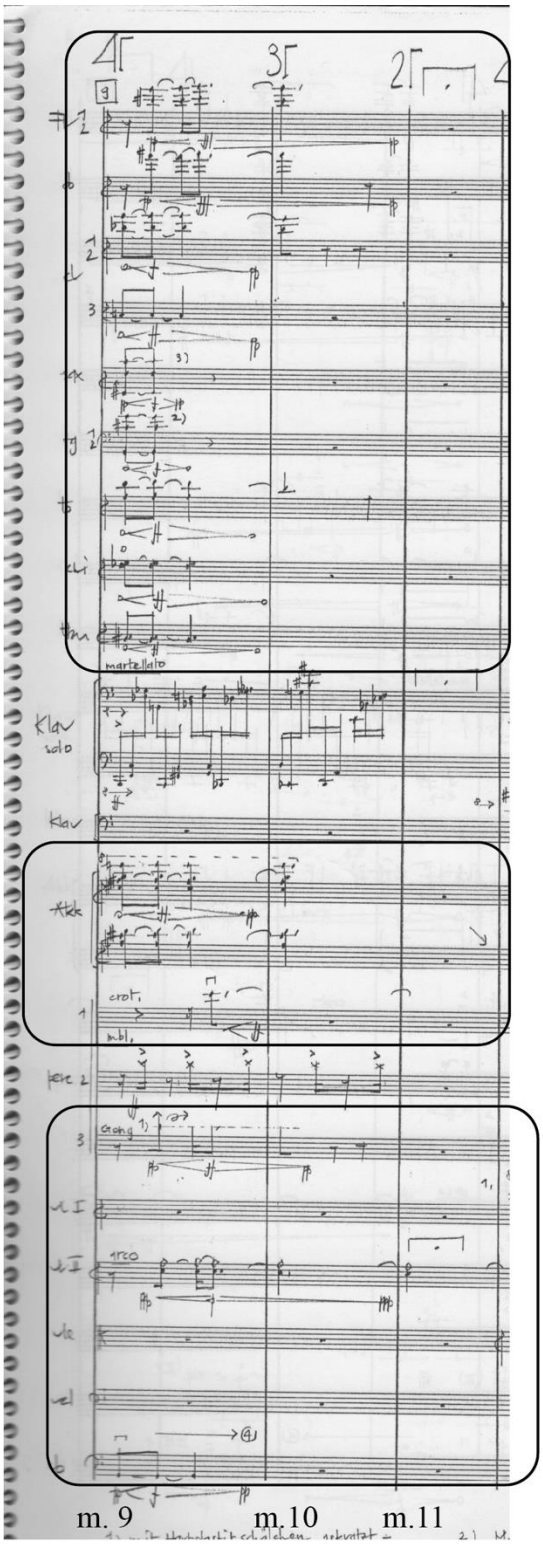


Figure 2.19: First measures of *CE 4a* sub-group from Beat Furrer's *Konzert für Klavier und Orchester*

CE 4b
(continues
through m.21)

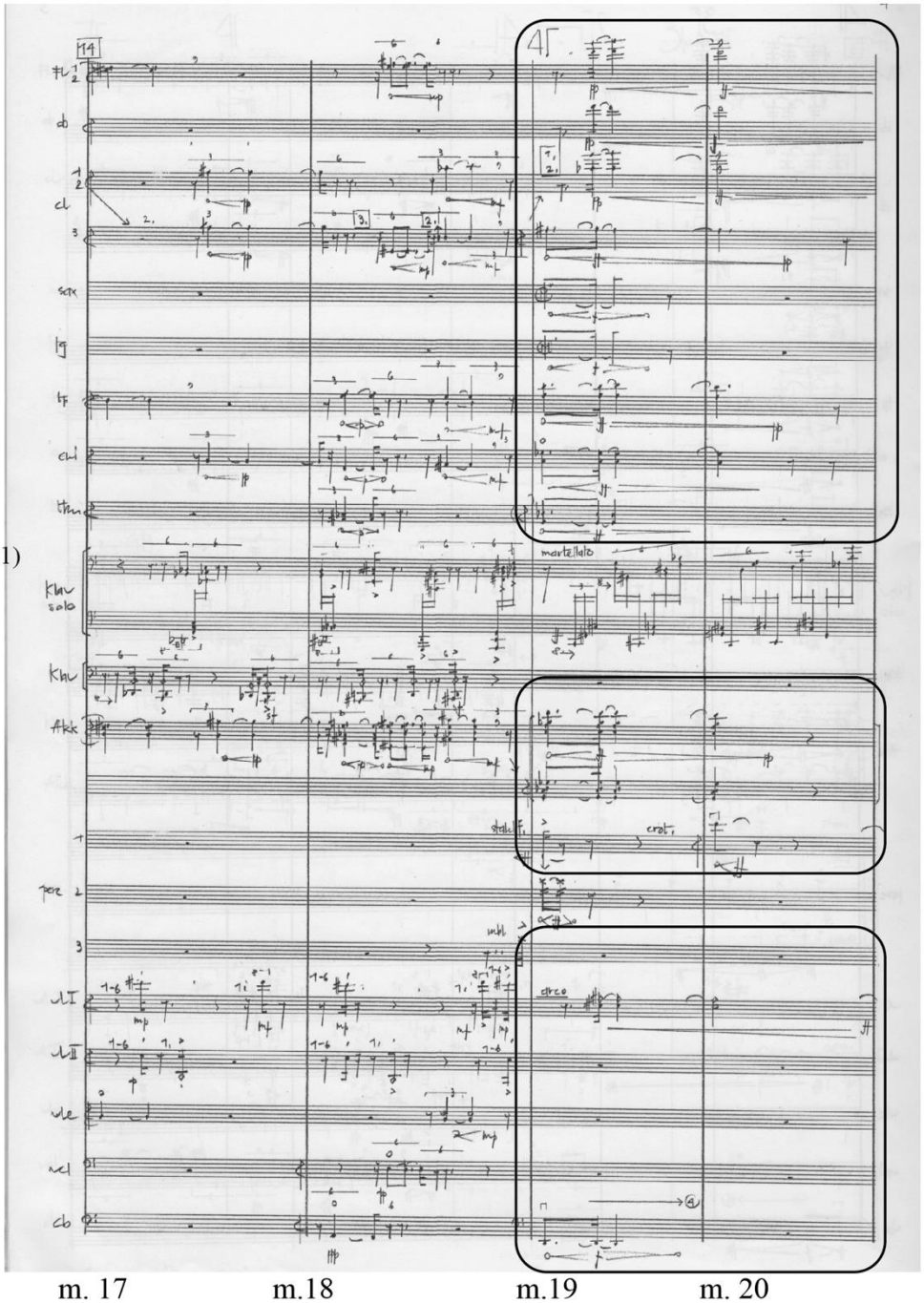


Figure 2.19 (Continued)

CE 4c
(continues
through m.31)

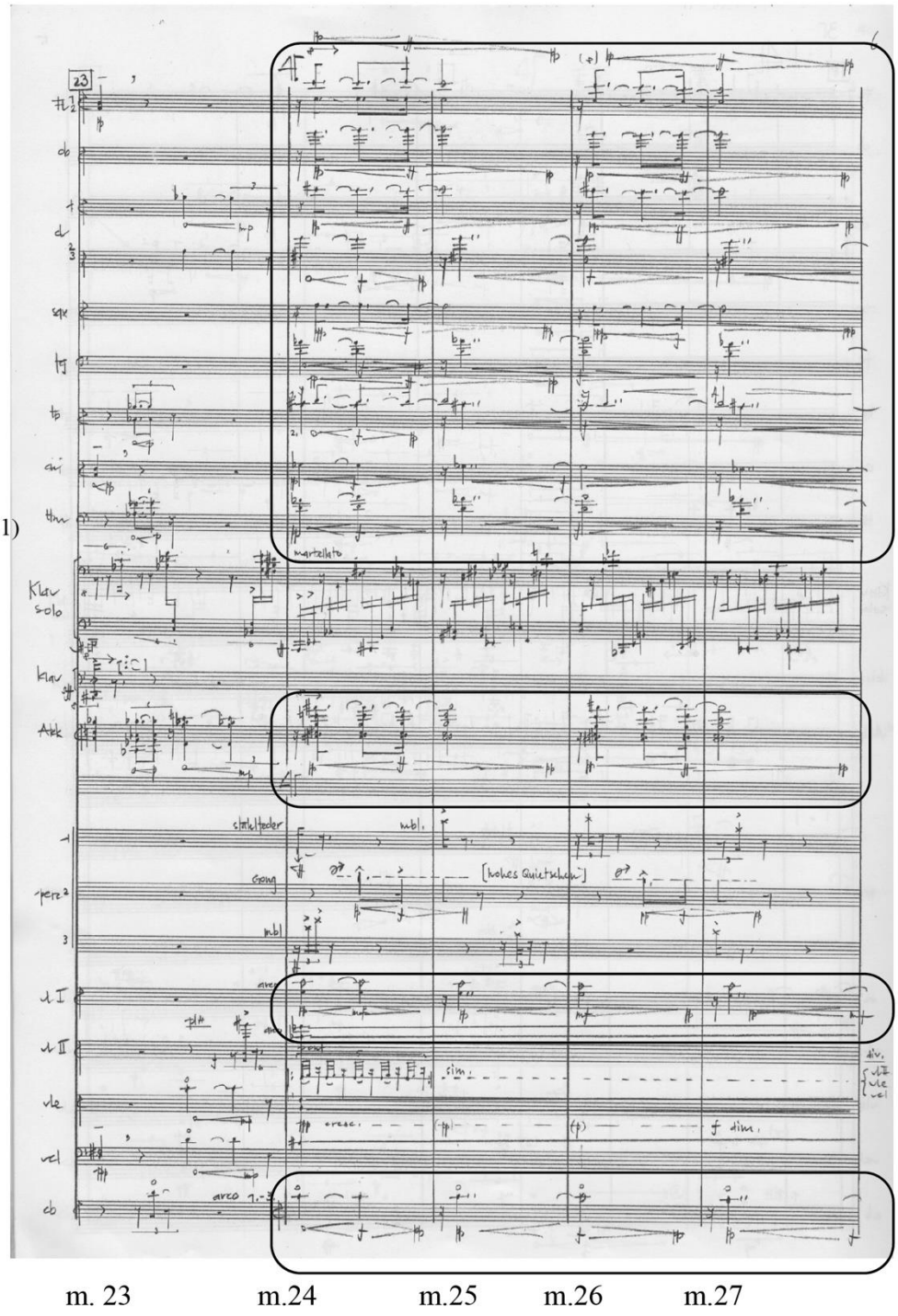


Figure 2.19 (Continued)

CE 4d

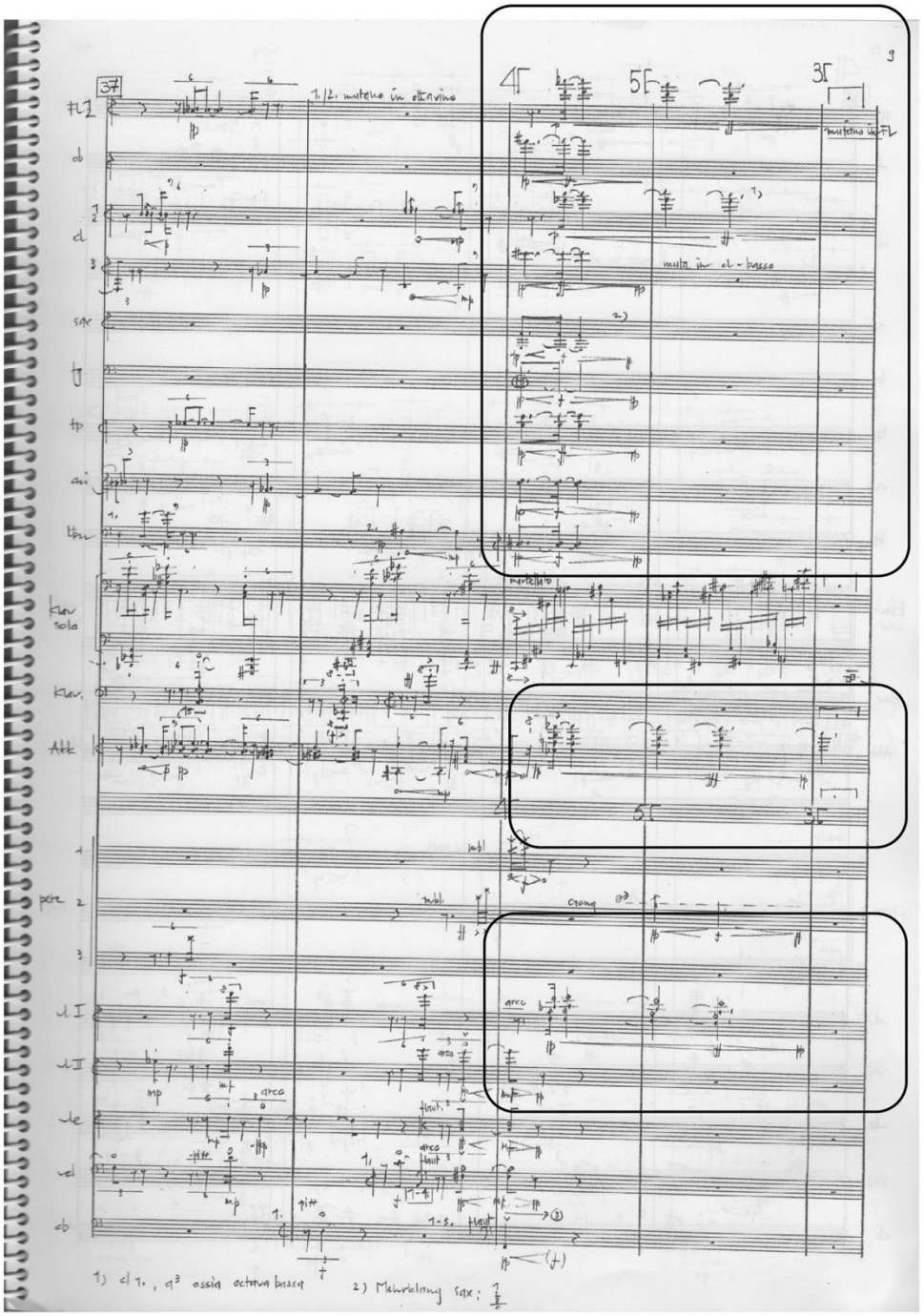


Figure 2.19 (Continued)

CE 4e
(continues
through m.62)

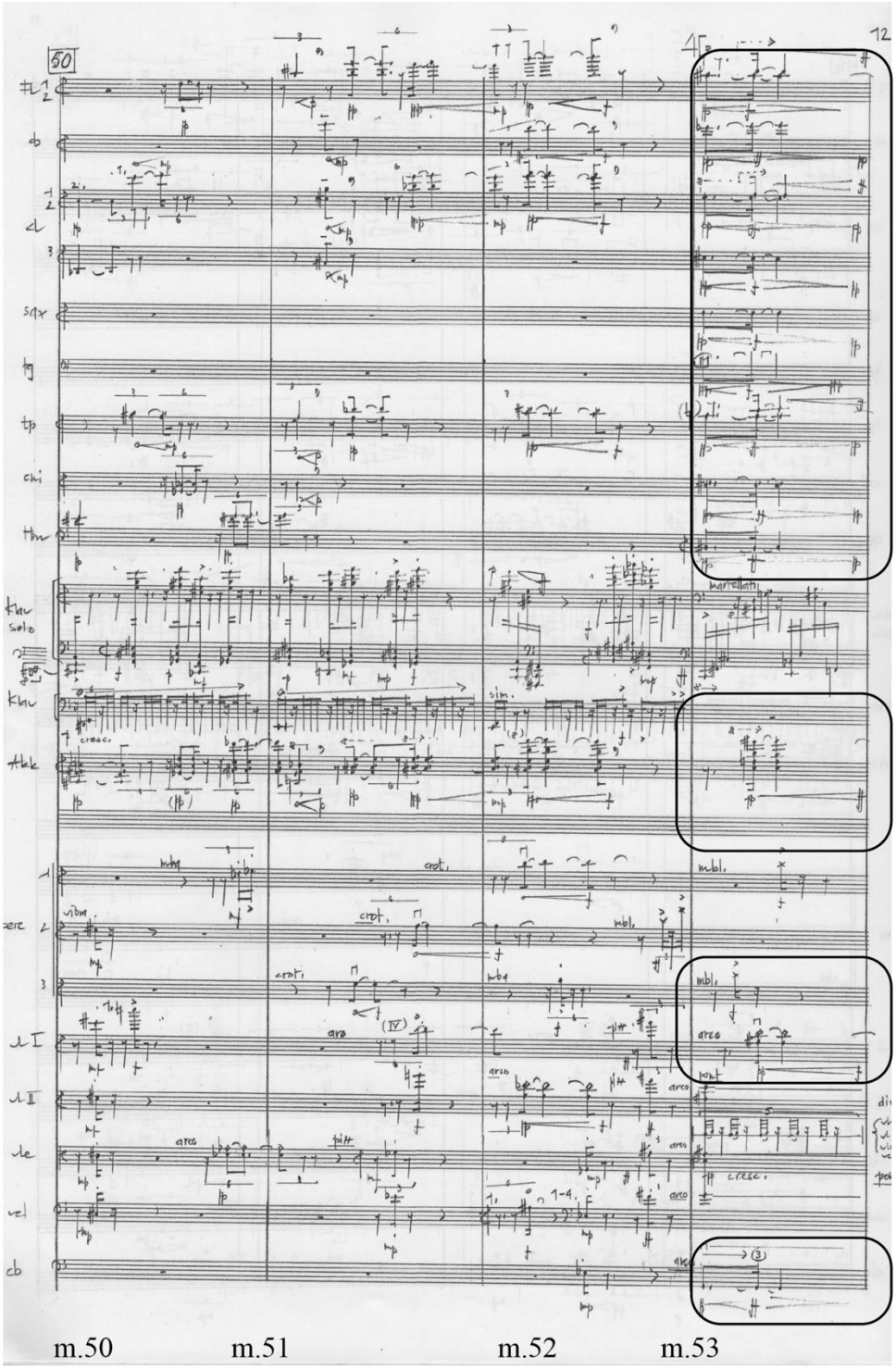


Figure 2.19 (Continued)

CE 4g
(continues
through m.83)

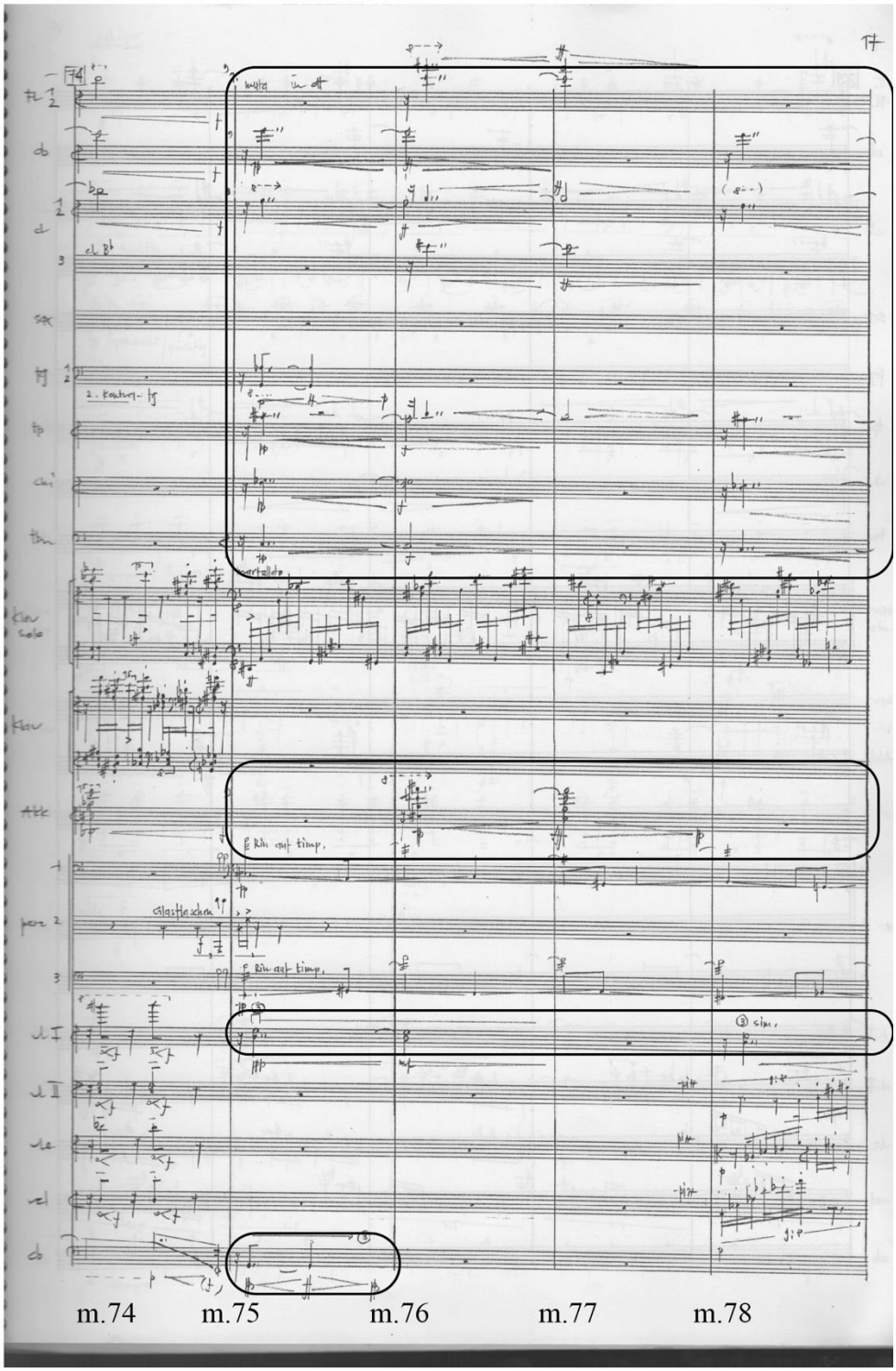


Figure 2.19 (Continued)

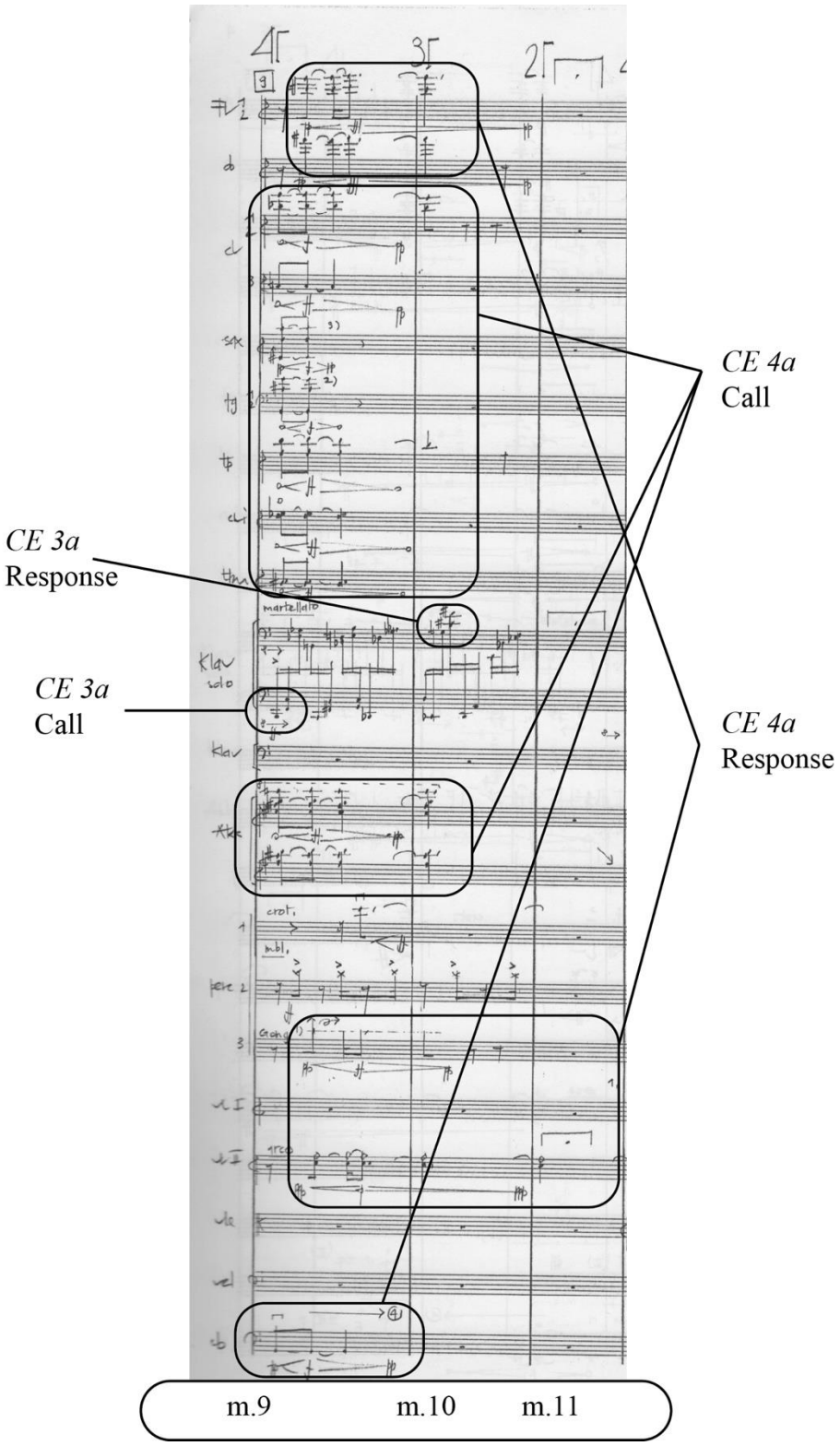


Figure 2.20: Call and response in *CE 3a* and *CE 4a* in *segment 1c* of Beat Furrer's *Konzert für Klavier und Orchester*

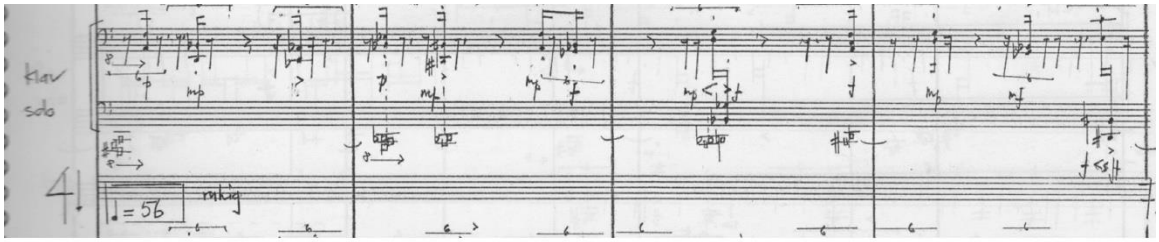


Figure 2.21: *CE 2a* in *segment 1a* of Beat Furrer's *Konzert für Klavier und Orchester*

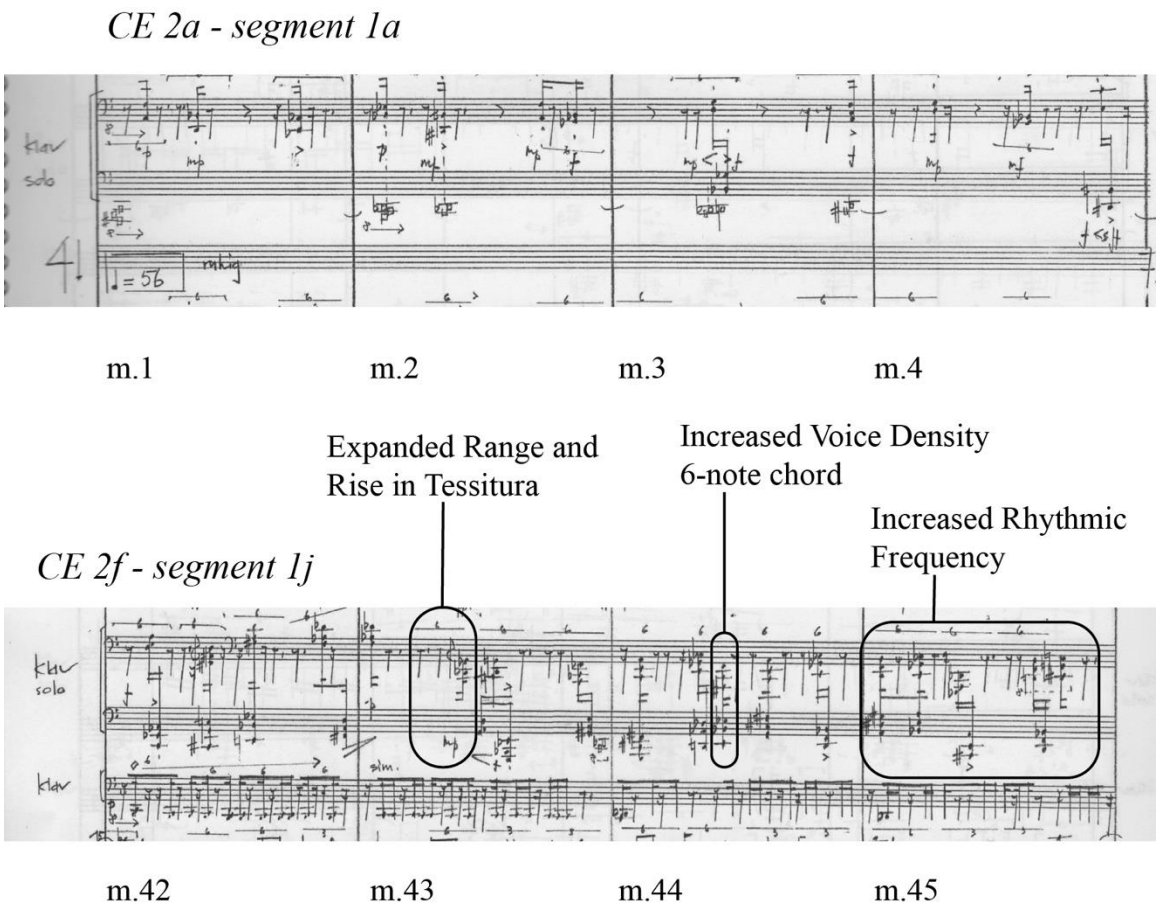


Figure 2.22: *CE 2a* in *segment 1a* and *CE 2f* in *segment 1j* demonstrating *CE 2a* sub-group transformation in Beat Furrer's *Konzert für Klavier und Orchester*

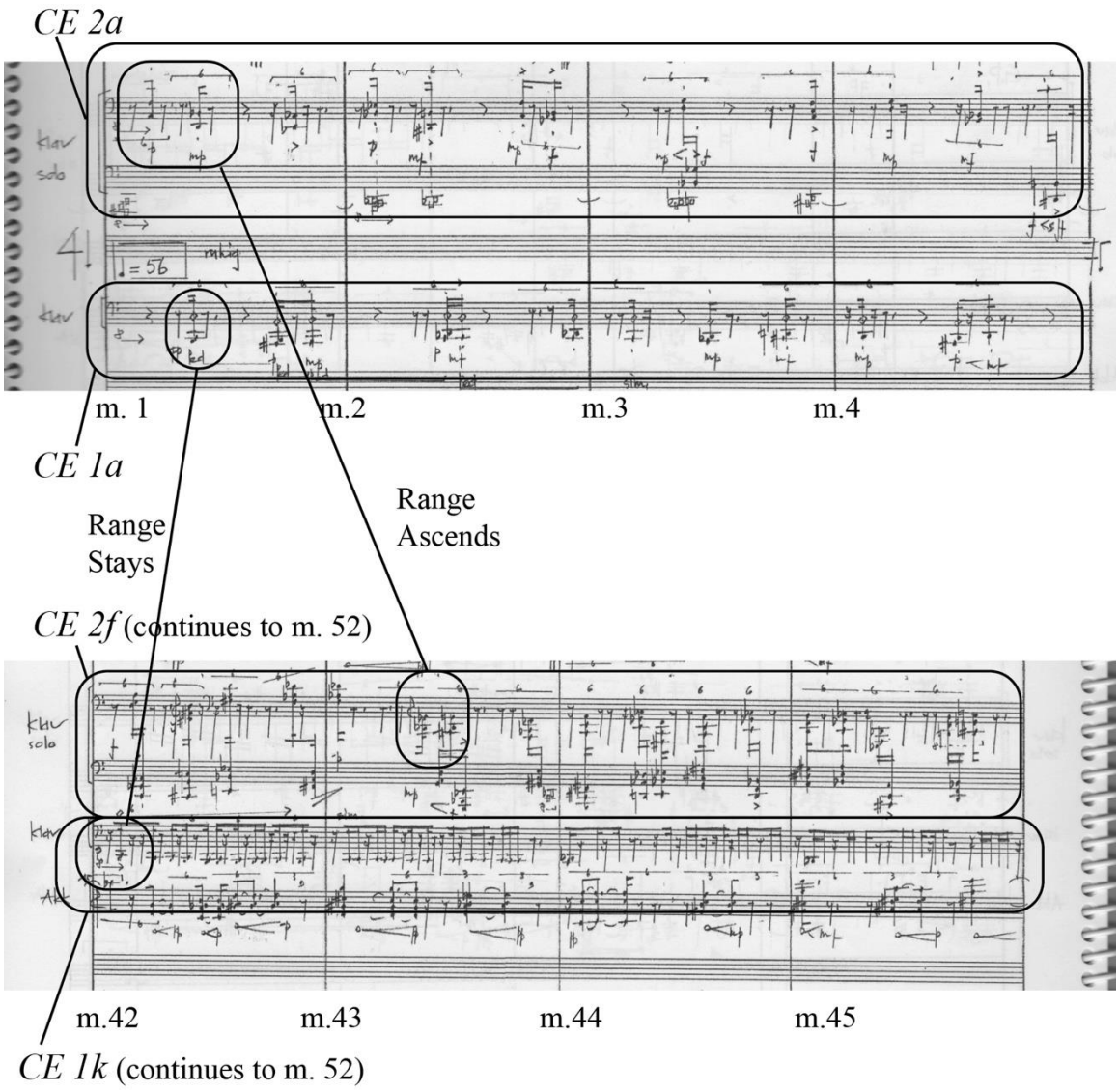


Figure 2.23: The *CE 2a* sub-group rising out of the *CE 1a* sub-group pedal during *S1C* in Beat Furrer's *Konzert für Klavier und Orchester*

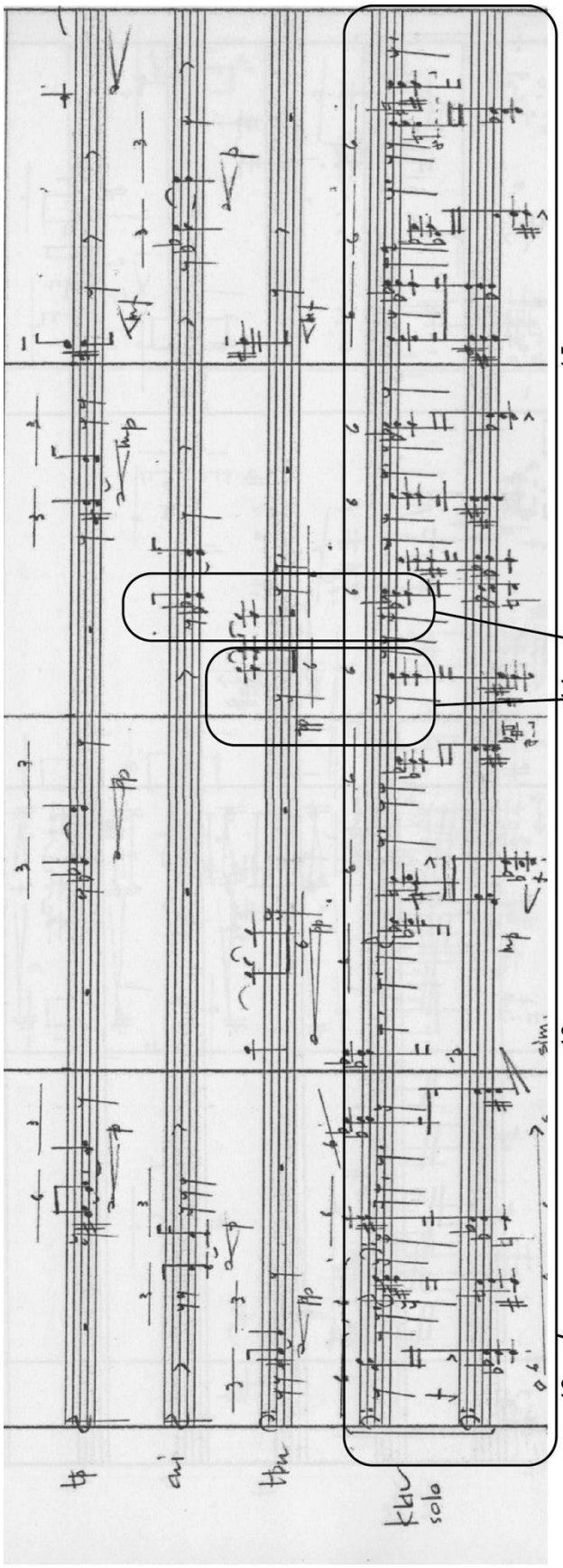


Figure 2.24: *CE 2f* of the *CE 2a* sub-group encroaching on the ensemble responses in *call segments* in *S1C* of Beat Furrer's *Konzert für Klavier und Orchester*

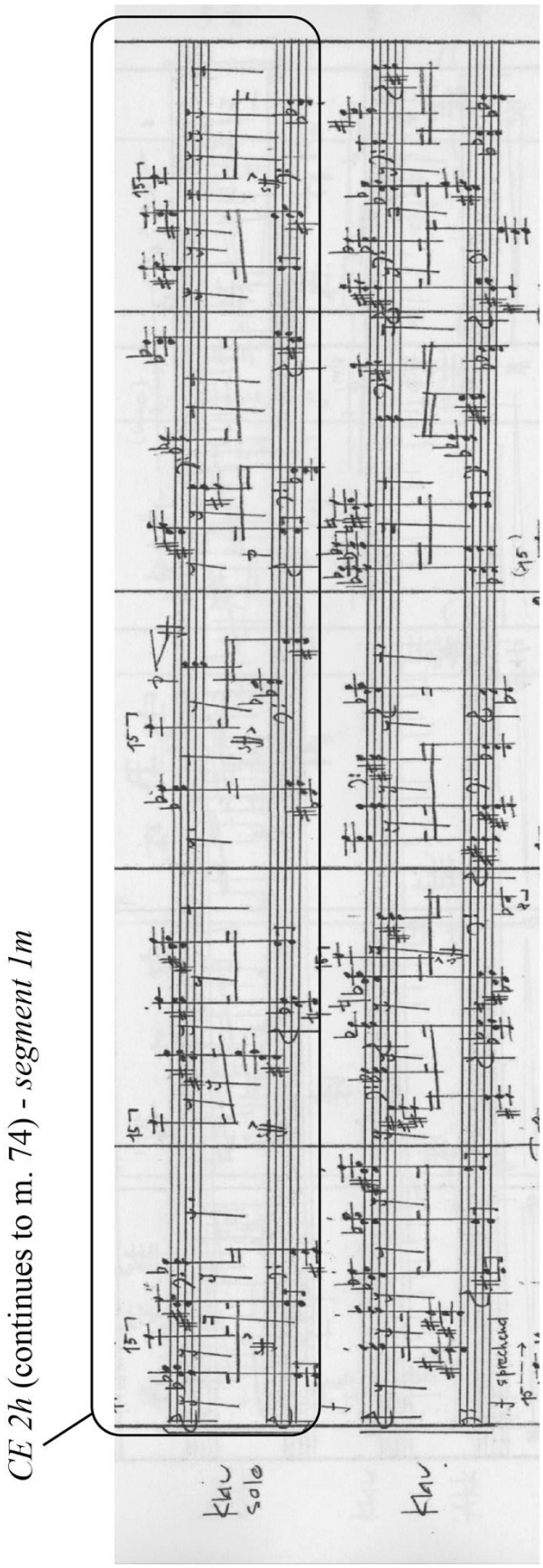


Figure 2.25: The ensemble piano joins with *CE 2j* of the *CE 2a* sub-group in *segment 1m* in Beat Furrer's *Konzert für Klavier und Orchester*

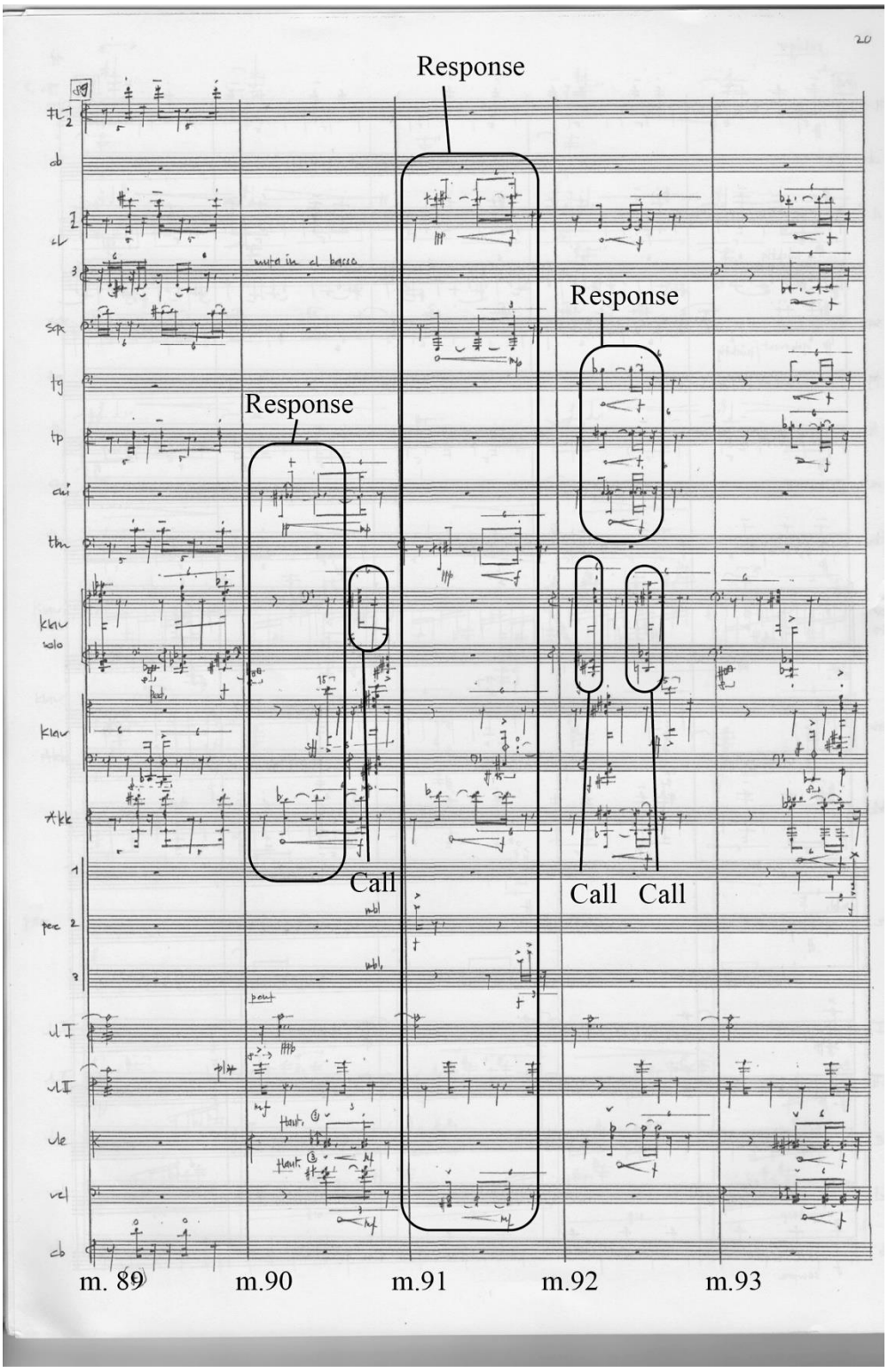


Figure 2.26: "Response as Call" and "Call as Response" in *CE 2j* in *segment 1p* of Beat Furrer's *Konzert für Klavier und Orchester*

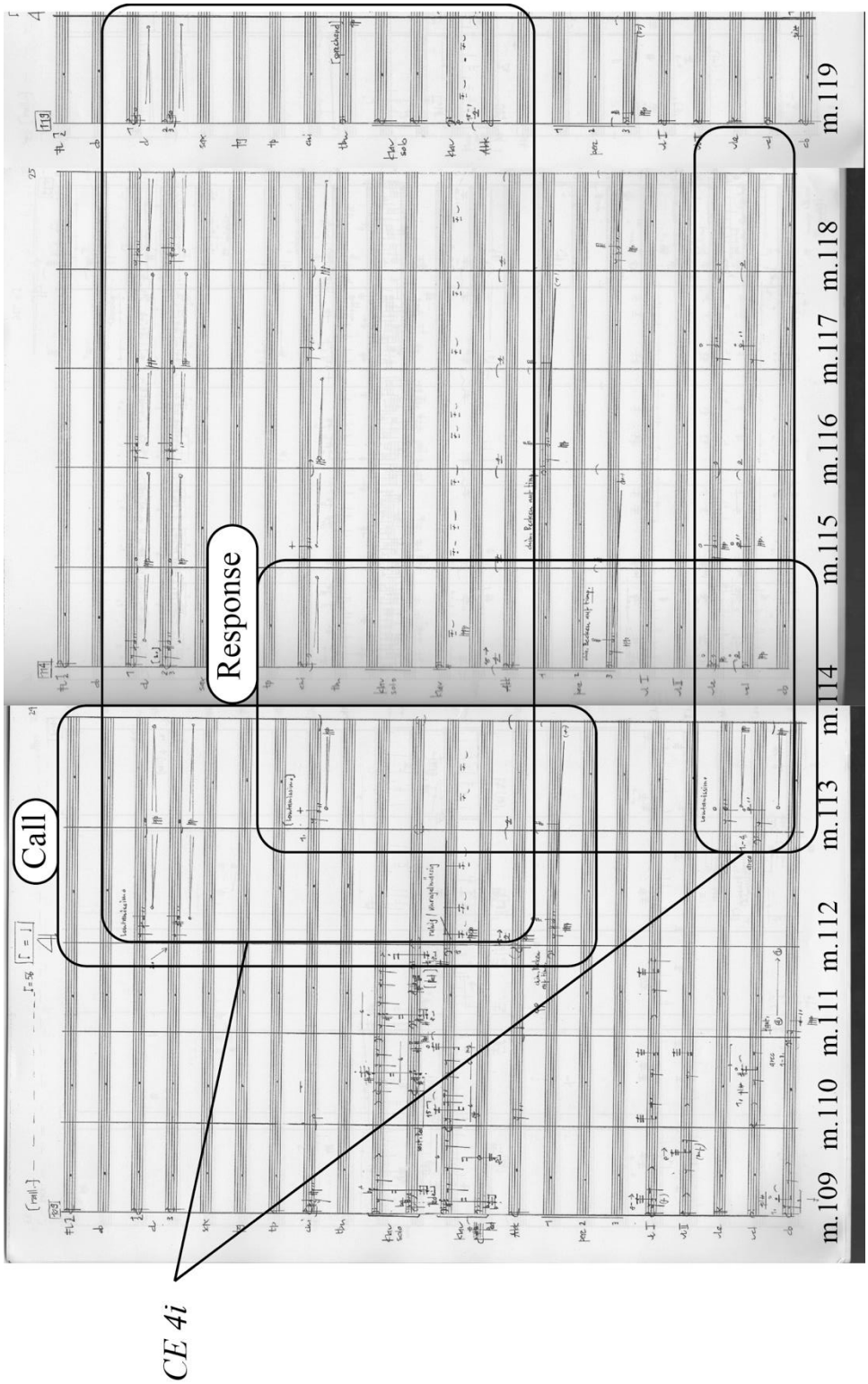


Figure 2.27: Call and Response in *CE 4i* in *segment 1r* of Beat Furrer's *Konzert für Klavier und Orchester*

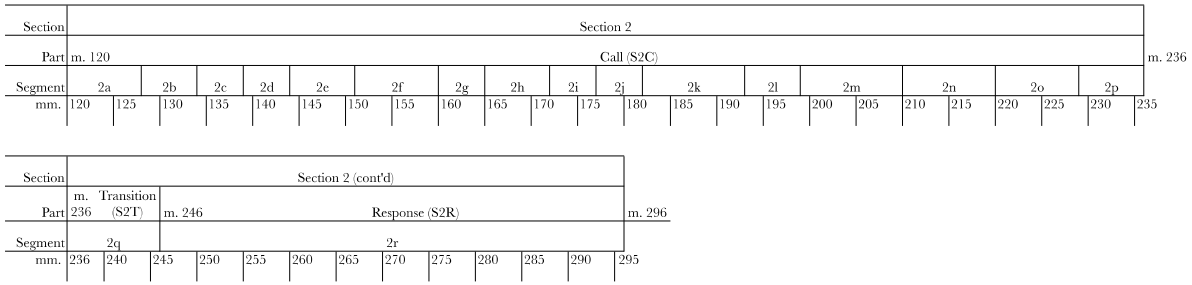


Figure 2.28: Formal parsing of *Section 2* of Beat Furrer's *Konzert für Klavier unde Orchester*

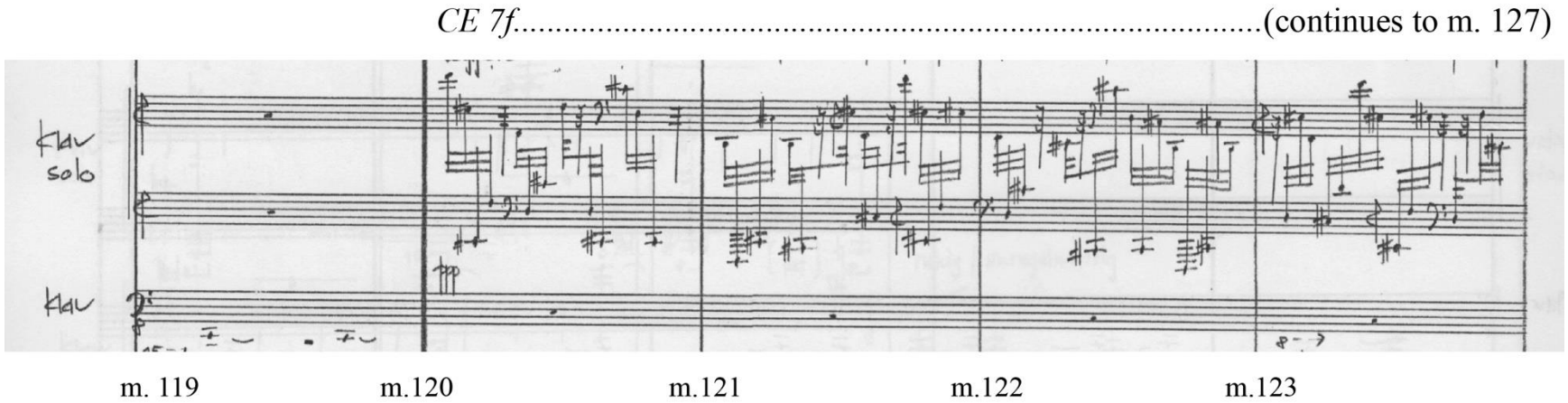
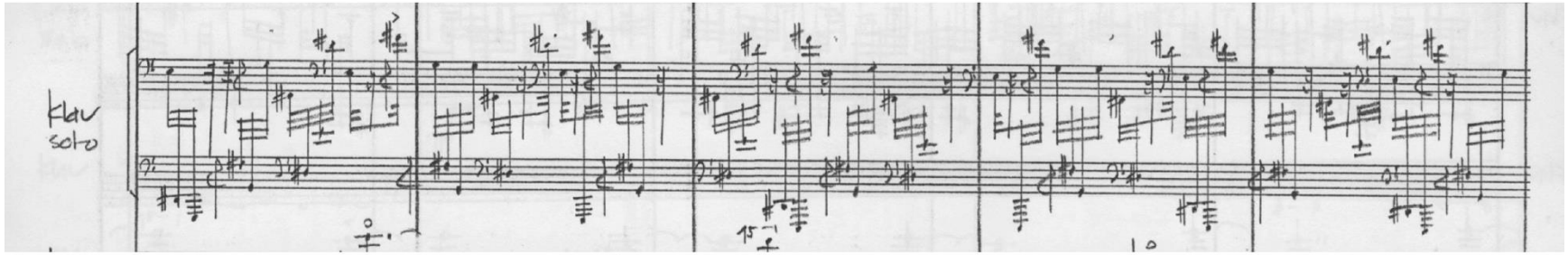


Figure 2.29: Opening measures of *Chromatic Event 7f* in *segment 2a* of Beat Furrer's *Konzert für Klavier und Orchester*

Table 2.6: *Segment* ID, name, and location for *segments* contained in *Section 2* of Beat Furrer's *Konzert für Klavier und Orchester*

ID	Descriptive Name	mm.
2a	Arpeggio I	120 – 128
2b	Arpeggio II	128 – 133
2c	Octaves I	134 – 138
2d	Arpeggio III	139 – 144
2e	Arpeggio IV	144 – 150
2f	Arpeggio V	151 – 159
2g	Rising Arpeggio I	160 – 164
2h	Octaves II	165 – 171
2i	Arpeggio VII	172 – 176
2j	Rising Arpeggio II	177 – 181
2k	Piano Ascent I	182 – 192
2l	Fanfare I	193 – 198
2m	Solo Piano Clusters I	199 – 209
2n	Double Piano Clusters II	210 – 219
2o	High Piano Chords I	220 – 228
2p	Fanfare II	229 – 235
2q	Transition II	236 – 245
2r	Mensuration Round	246 – 295

End of *CE 7g* - Arpeggiated "Call"



Beginning of *CE 8h* - Unison "Response"

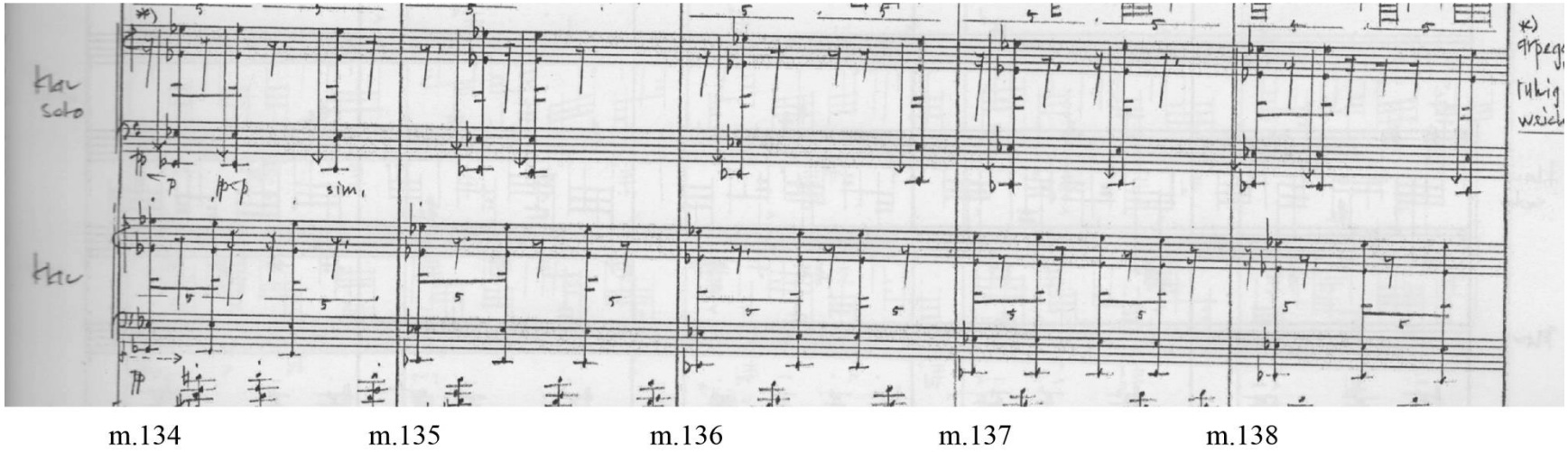


Figure 2.30: Arpeggiated "call" and unison "response" between *CE 7g* in *segment 2b* and *CE 8h* in *segment 2c* of Beat Furrer's *Konzert für Klavier und Orchester*

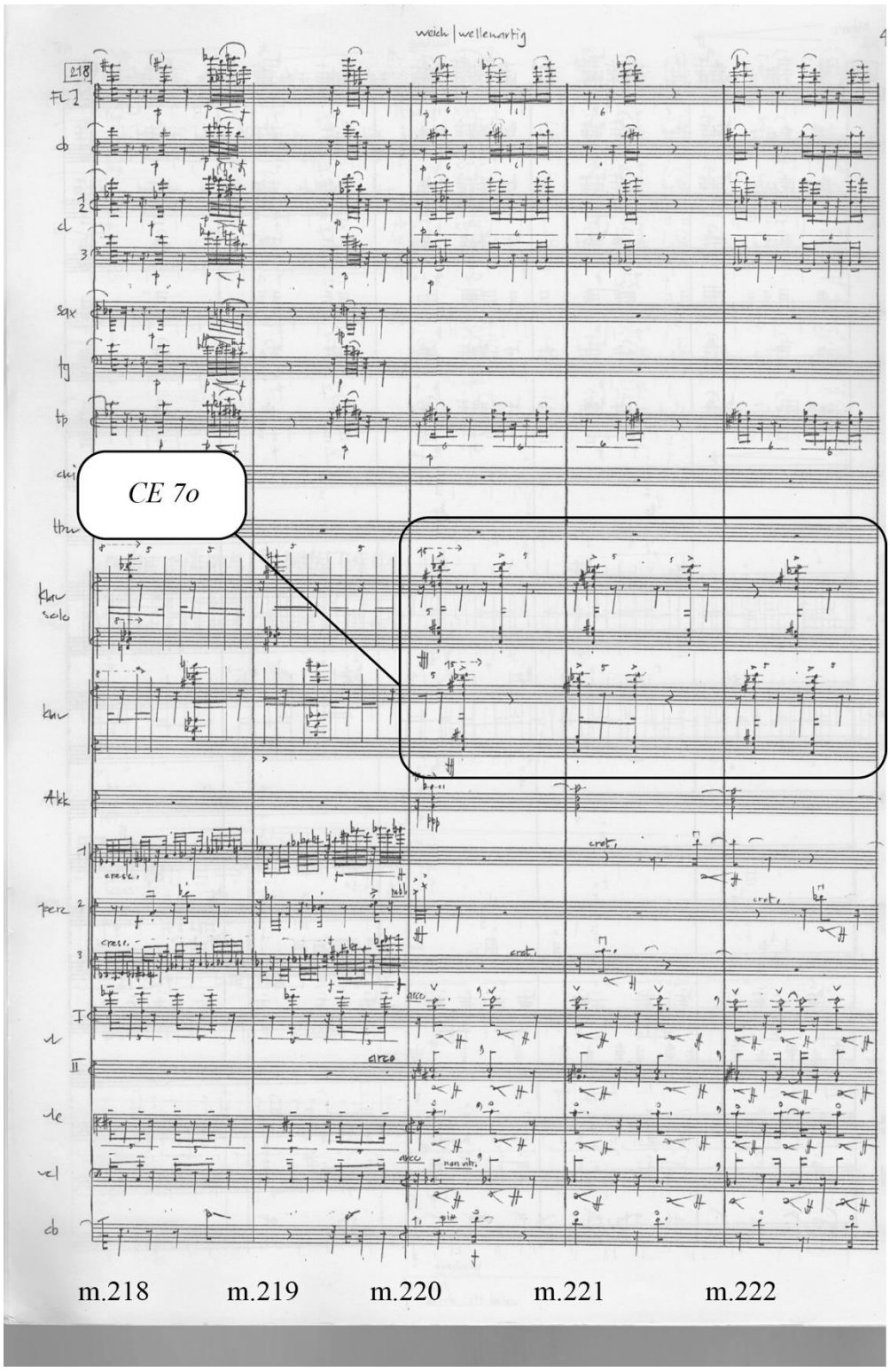


Figure 2.31: The beginning of *CE 7o* in *segment 2o*, the climax of *S2C* of Beat Furrer's *Konzert für Klavier und Orchester*

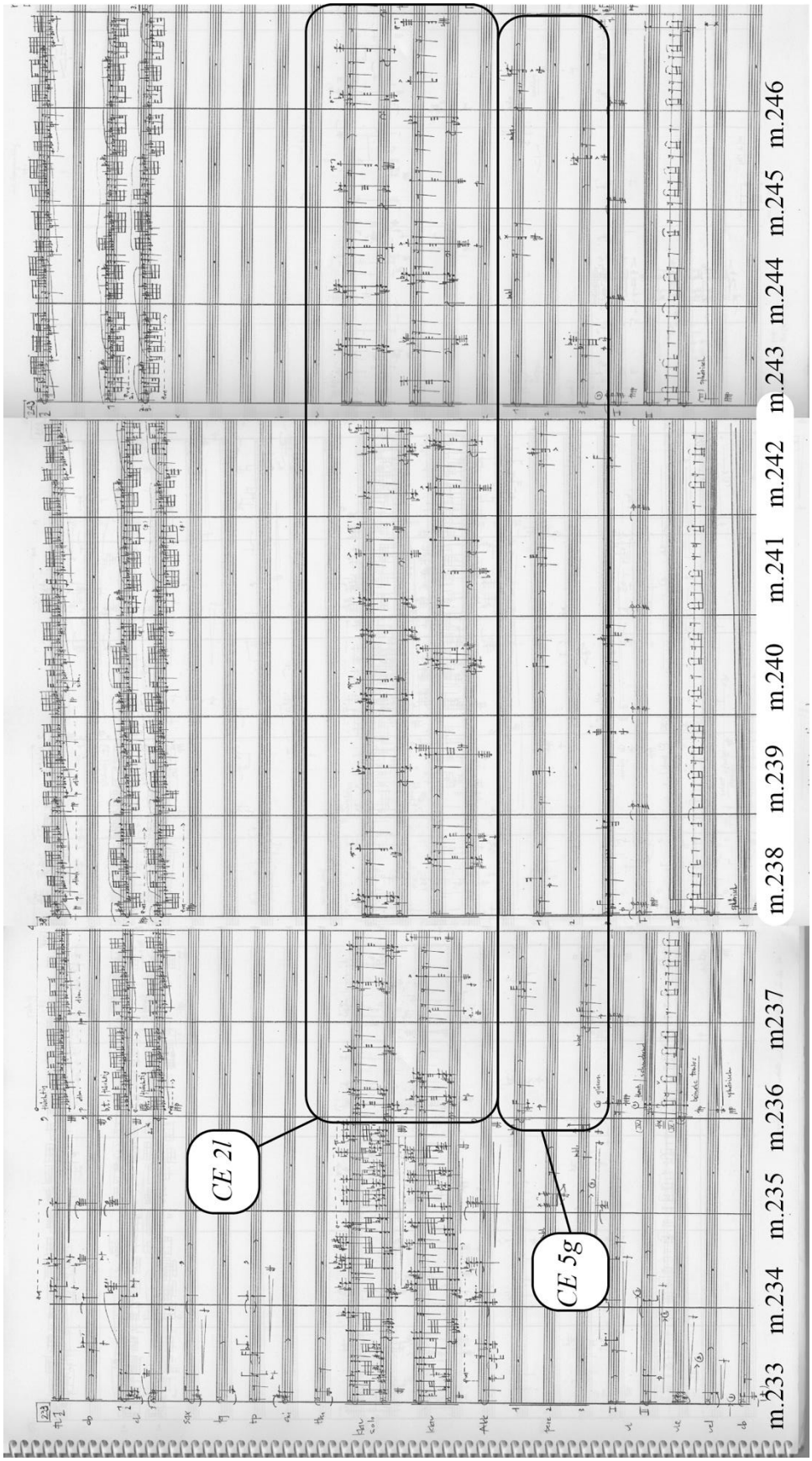


Figure 2.32: *CE 2l* and *CE 5g* from *S2T* in Beat Furrer's *Konzert für Klavier und Orchester*

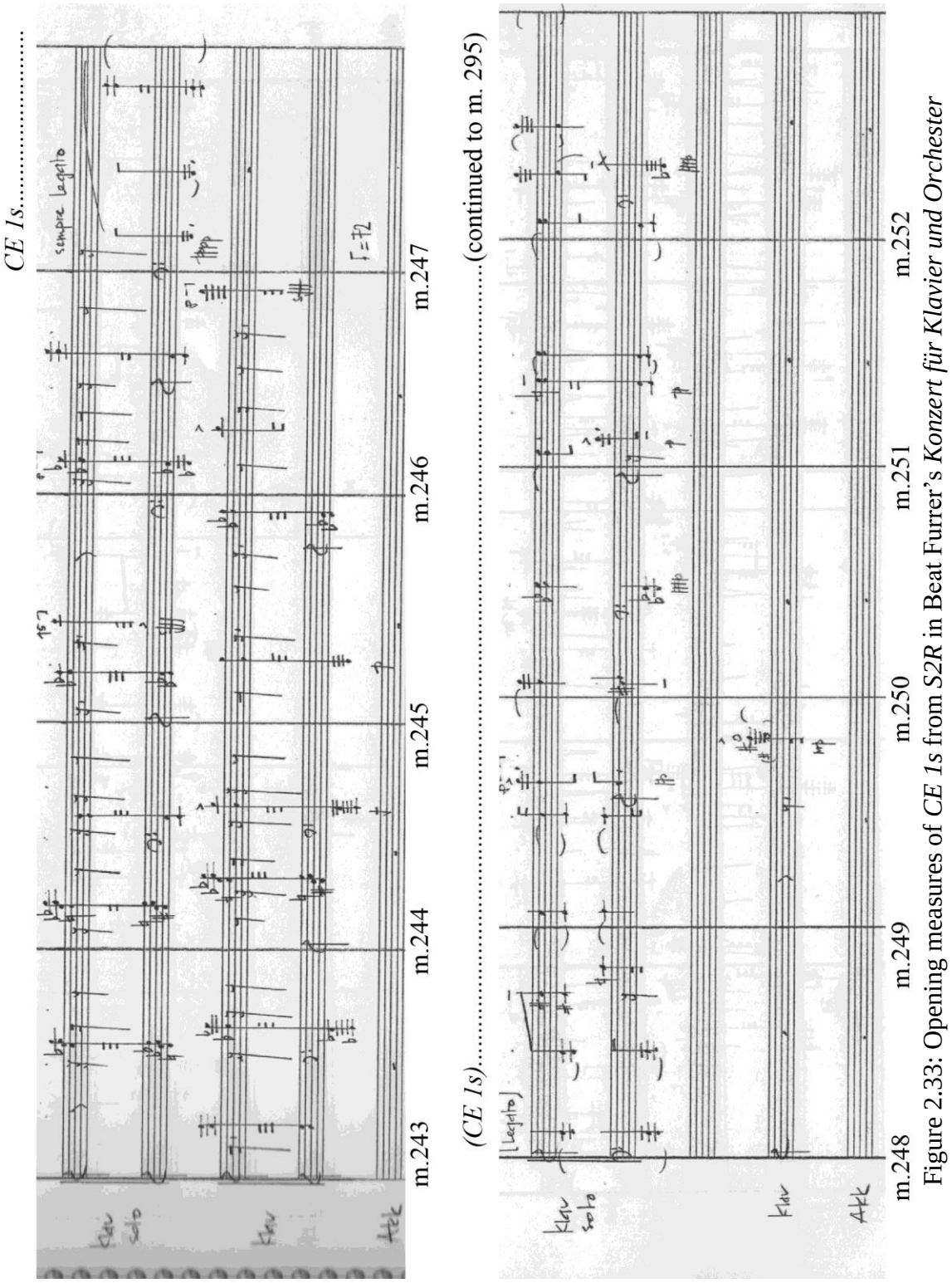


Figure 2.33: Opening measures of *CE 1s* from S2*R* in Beat Furrer's *Konzert für Klavier und Orchester*

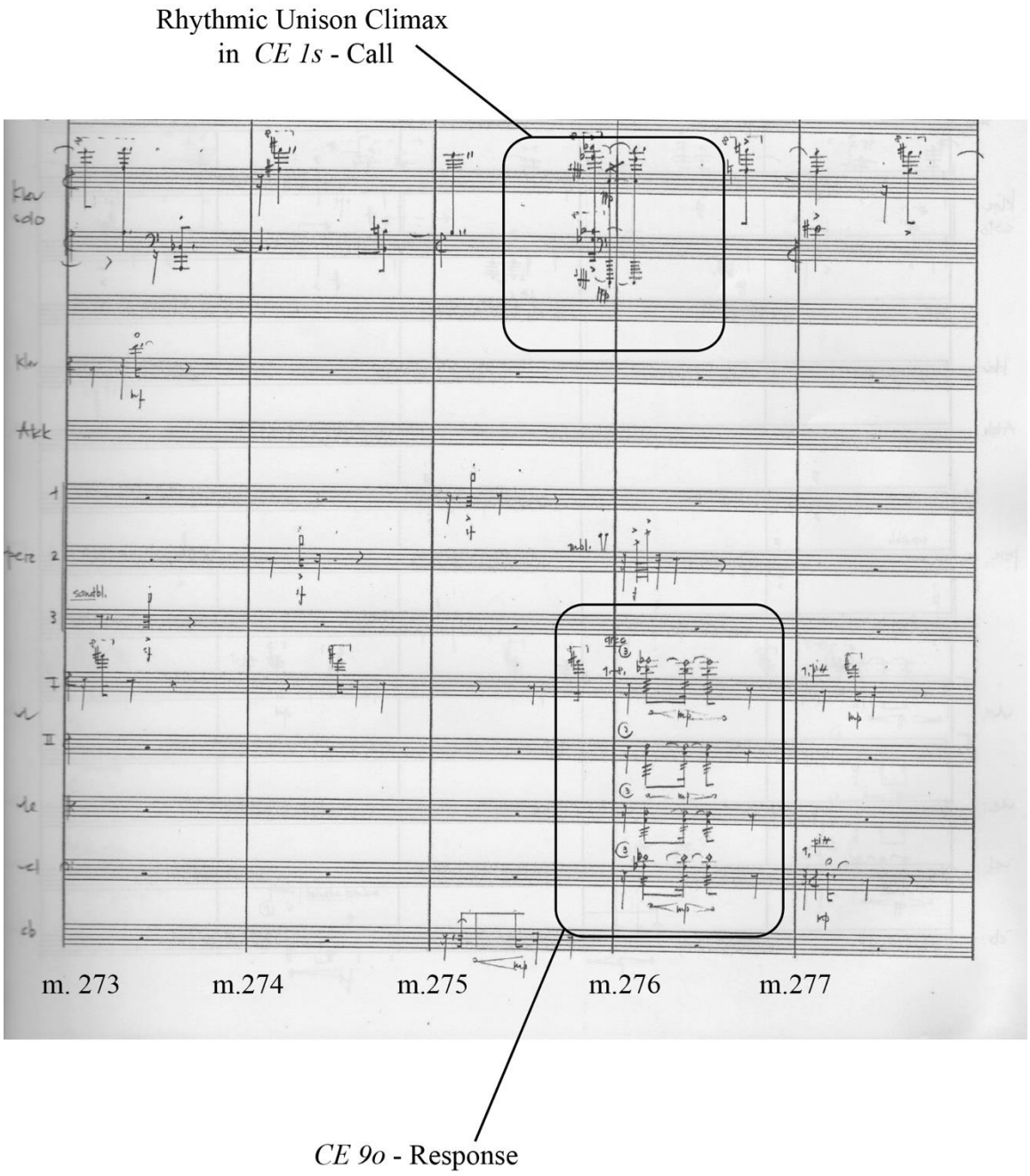


Figure 2.34: "Call and response" between a climactic rhythmic unison in *CE 1s* and *CE 9o* in *S2R* of Beat Furrer's *Konzert für Klavier und Orchester*

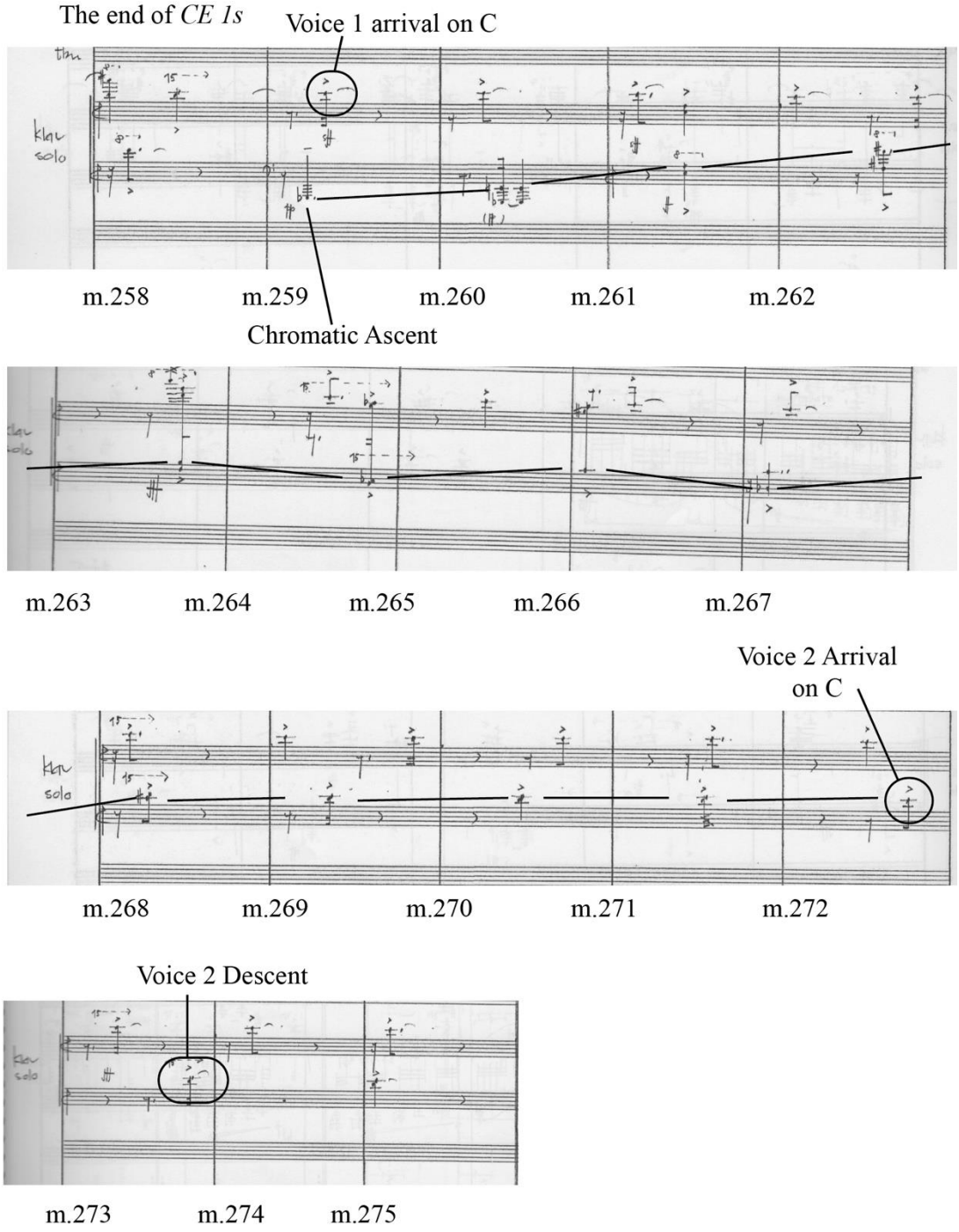


Figure 2.35: Arrival of voice 1, chromatic ascent of voice 2 and arrival of voice 2 in *CE 1s* in *S2R* of Beat Furrer's *Konzert für Klavier und Orchester*

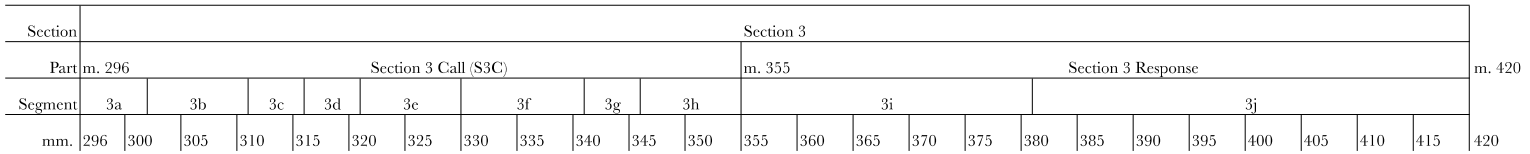


Figure 2.36: Formal parsing of *Section 3* of Beat Furrer's *Konzert für Klavier und Orchester*

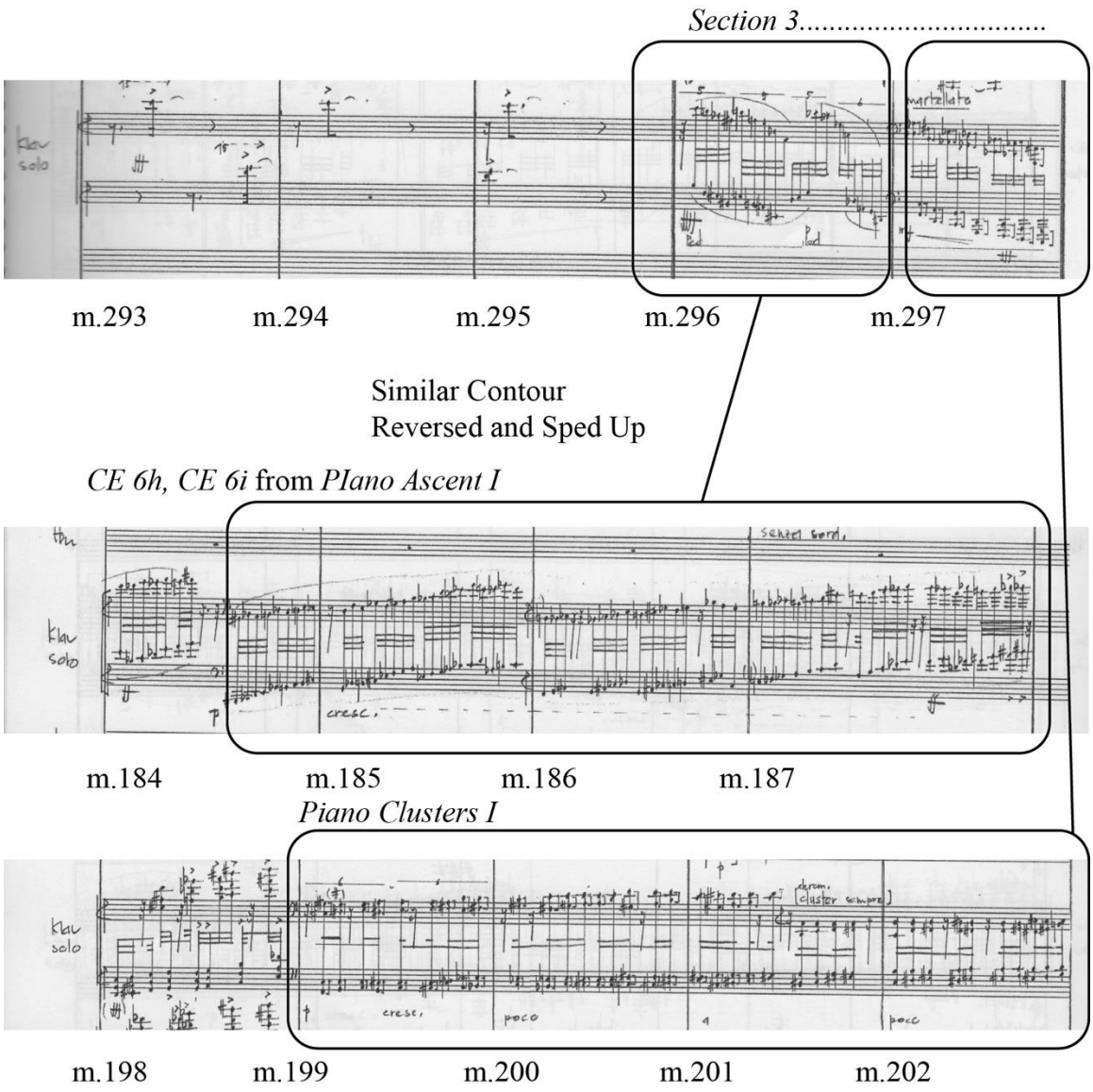
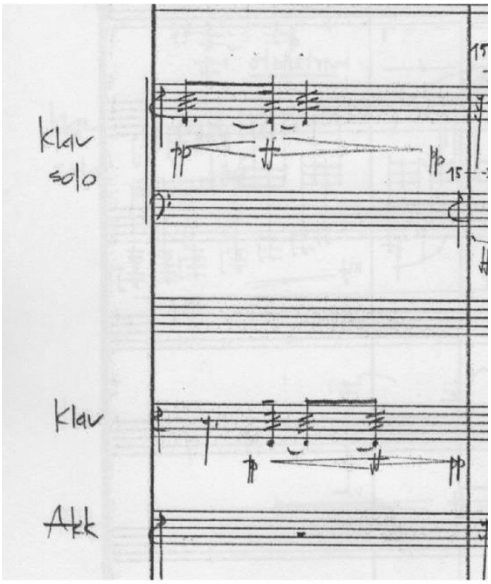


Figure 2.37: Related Material in *Fanfare III*, the beginning of *Section 3*, and *Piano Ascent I and Piano Clusters I* in Beat Furrer's *Konzert für Klavier und Orchester*

Table 2.7: *Segment* ID, name, and location for *segments* contained in *Section 3* of Beat Furrer's *Konzert für Klavier und Orchester*

ID	Descriptive Name	mm.
3a	Fanfare III	296 – 301
3b	Repeated Structures	302 – 310
3c	Hammered Chords	311 – 315
3d	Octaves III	316 – 320
3e	Piano Ascent II	321 – 329
3f	Double Piano Clusters II	330 – 340
3g	High Piano Chords II	341 – 345
3h	Fanfare IV	346 – 354
3i	Descent I	355 – 380
3j	Descent II	381 – 420

CE 7q



m. 298

Figure 2.38: *Ce 7q* in m. 298 of Beat Furrer's *Konzert für Klavier und Orchester*

CE 7s

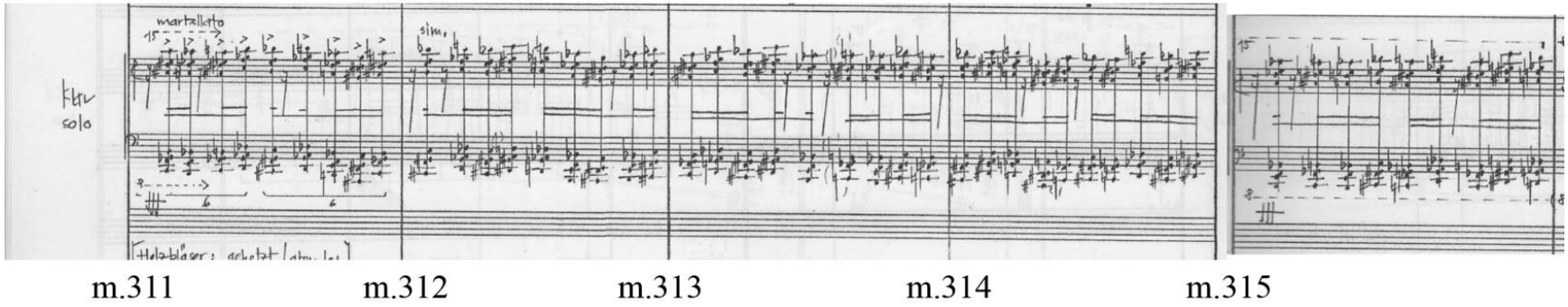


Figure 2.39: *CE 7s* – solo piano hammered chords in *Hammered Chords* in *Section 3* of Beat Furrer's *Konzert für Klavier und Orchester*

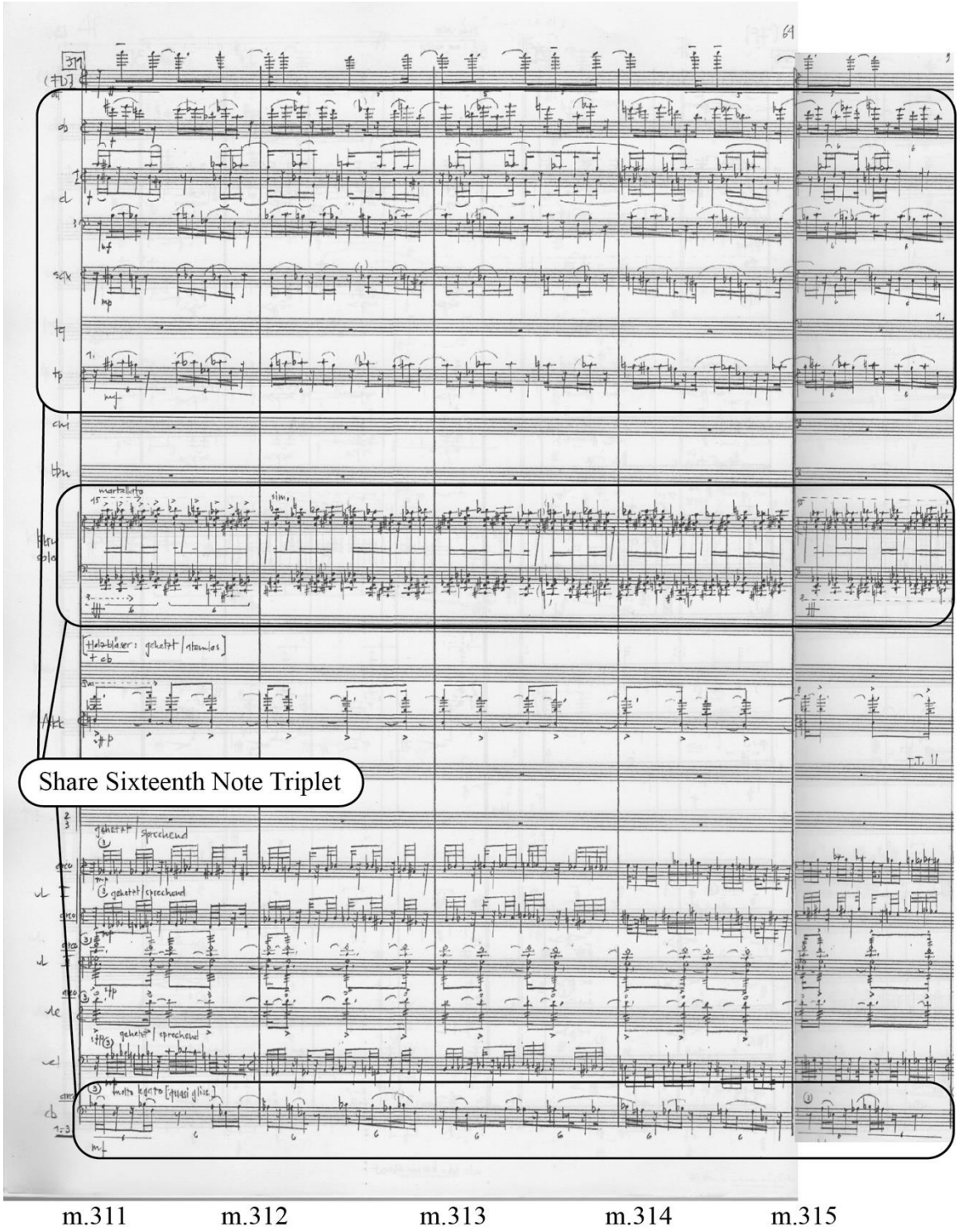


Figure 2.40: Homorhythmic texture in *Hammered Chords* in *Section 3* of Beat Furrer's *Konzert für Klavier und Orchester*

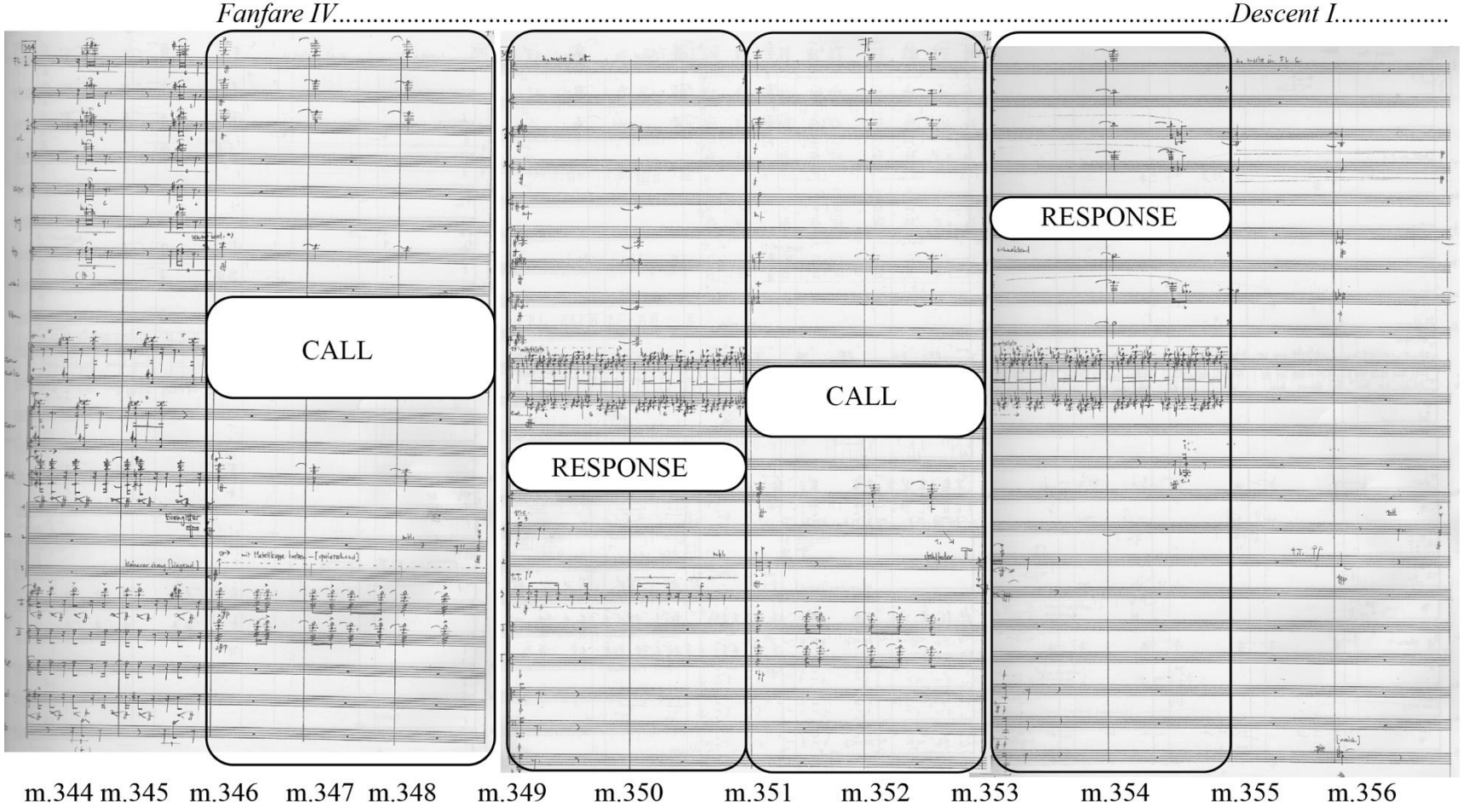


Figure 2.41: Call and response in *Fanfare IV*, the compositional climax of Beat Furrer's *Konzert für Klavier und Orchester*

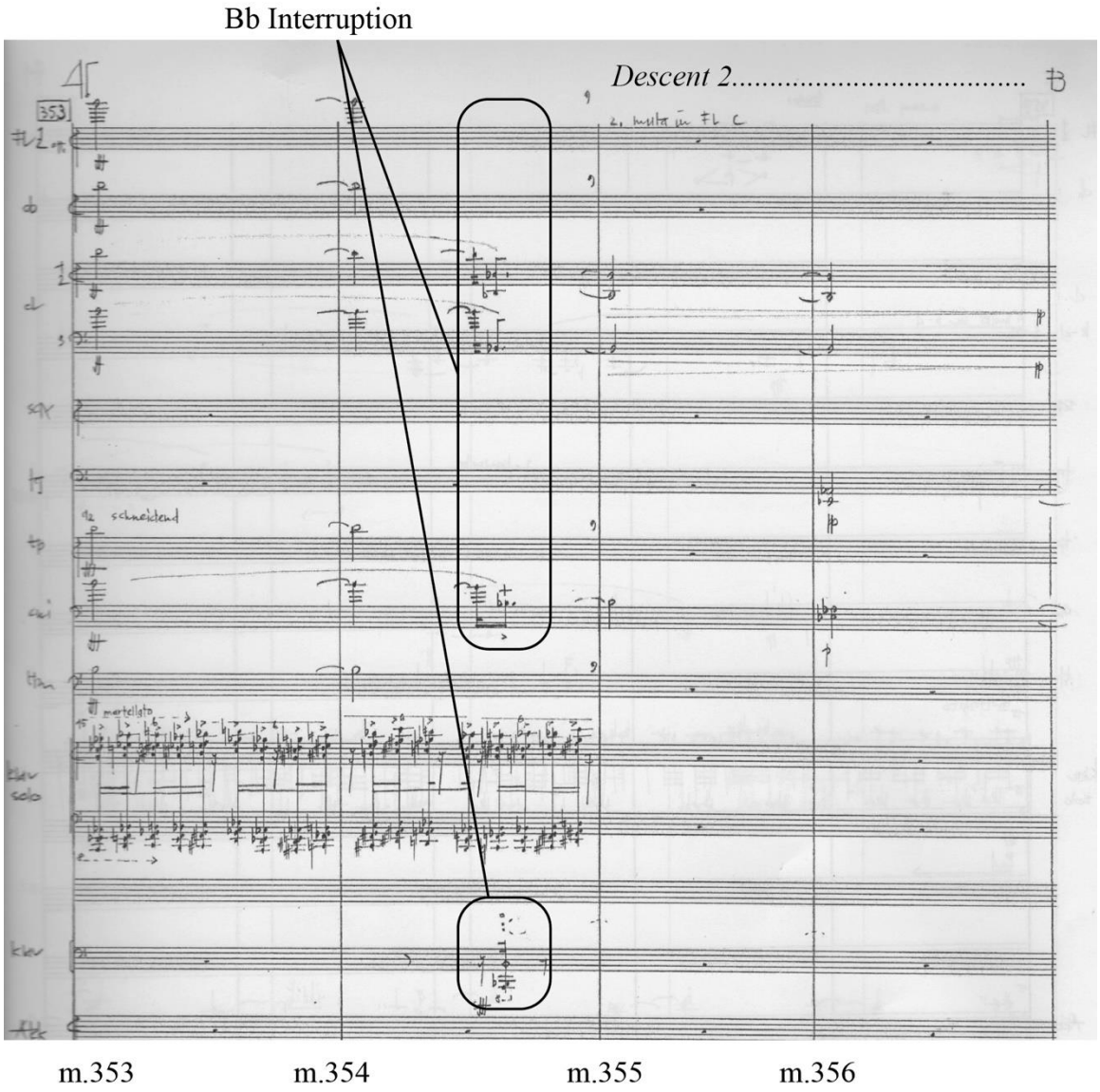


Figure 2.42: Bb interruption ending *Fanfare IV* and beginning *Section 3 Response* in Beat Furrer's *Konzert für Klavier und Orchester*

(Descent I).....Descent II.....

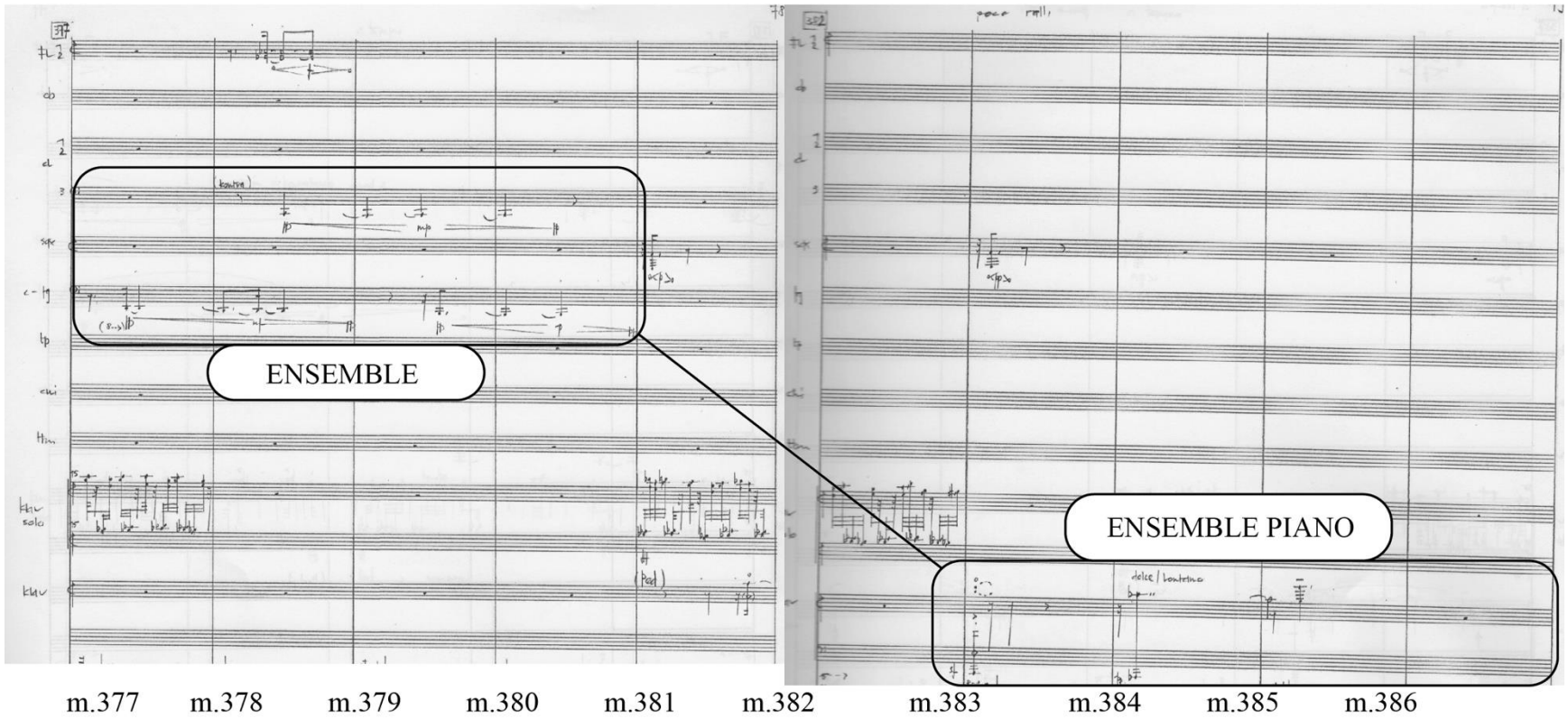


Figure 2.43: Ensemble descent in *Descent I* transfers to the ensemble piano in *Descent II* in Beat Furrer's *Konzert für Klavier und Orchester*

(DESCENT II).....

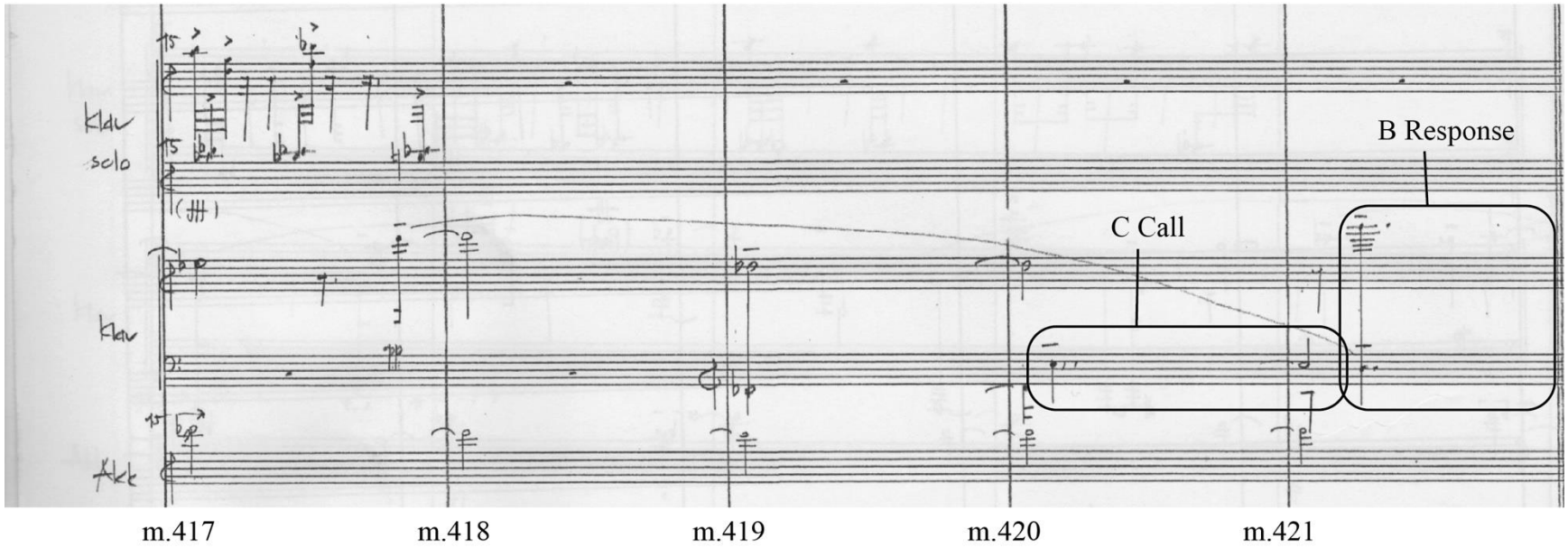


Figure 2.44: Final gesture in Beat Furrer's *Konzert für Klavier und Orchester*: C Call and B Response

Gesture	CALL	RESPONSE	CALL	RESPONSE	CALL	RESPONSE	CALL	RESPONSE	CALL	RESPONSE	CALL	RESPONSE	CALL	RESPONSE
Segment	CALL		RESPONSE		CALL		RESPONSE							
Part	CALL (S1C)								RESPONSE (S1R)					

Figure 2.45: Three levels of “Call and Response” nesting

CHAPTER 3

CHROMATIC SCALE AS PRIMARY MUSICAL MATERIAL I

An examination of *chromatic events* that contain a direct projection of the chromatic scale, performed by the ensemble or solo piano, illustrates how the ascending or descending chromatic scale function in this concerto in two ways: 1) as a musical gesture within a *segment* or 2) as connective chromatic framework from *segment* to *segment.*[13] *CEG 1* contains such events, classed into four sub-groups:[14]

- *CE 1a* sub-group
- *CE 1b* sub-group
- *CE 1q – 1r*
- *CE 1s – 1t*

The *CE 1a* and *1b* sub-groups only occur in *Section 1 Call* in both the solo and ensemble piano. *CE 1q – 1r* includes the two clear solo piano chromatic ascents in *Section 2 Call,* and *CE 1s – 1t* features chorale-like performances of the chromatic scale performed by the solo piano in *Section 2 Response,* and the ensemble piano in *Section 3 Response*. Musical characteristics and elements of *CE 1q* and *1r* are analyzed in this chapter, while

[13] The ensemble piano has a dual role in this composition, sometimes allying with the ensemble, other times with the solo piano, and occasionally asserting its own independence.
[14] Figure 3.1 shows the first bars of the first chromatic even in the *Ce 1a* and *CE 1b* sub-groups as well as *CE 1q, 1r, 1s,* and *1t*.

CE 1s and *1t* are examined in the next chapter. The role of the *CE 1a* and *1b* sub-groups as *part*-level formal determinants is a core tenet of Chapter 5.

CE 1q is the first audible presentation of the ordered chromatic collection in the composition, occurring in the solo piano in measures 151 – 159. The ear can identify the chromatic ascent more easily than the eye, demonstrated in the actual solo piano notation for measure 151 to 159, Figure 3.2. *CE 1q* can be extracted from the surrounding piano arpeggiation, for ease of identification. Figure 3.3 is the extracted reduction of the ascent and shows that *CE 1q* consists of an accented arrhythmic chromatic ascent beginning on pitch class G that ascends up through the entire chromatic collection back to G, resulting in a loop of the chromatic collection. The ascent then continues up to pitch-class B. This ascent is varied by octave displacement and harmonization with one of the following intervals:

- One or more octaves
- A perfect fourth below
- A minor sixth above
- A major second below
- A minor second above

CE 1r is related to *CE 1q*, as it is comprised of a chromatic ascent in the solo piano that occurs in measures 172 – 176, but begins on pitch class C instead of G and only spans a major sixth instead of a major tenth. *CE 1q* and *CE 1r* combined account for nearly two ordered cycles through the chromatic collection. Both of these ascents also occur over other *chromatic events* presenting pedals. Figure 3.4, the score excerpts of *CE 1r* and *CE 1r*, shows that *CE 1r* emerges out of a pitch class {F F# G} pedal, *CE* 7km, and *CE 1q*

ascends into a pitch class {G# A} pedal, *CE 7m*.

CE 1q and *CE 1r* function as more than just musical material; they offer insight to the listener into the compositional logic of this concerto. When the chromatic scale is presented in such obvious fashion, it breaks the so-called "fourth wall" between the composer and the listener. Since chromatic ascent is key to this composition, breaking the "fourth wall" is necessary as it allows for a deeper perception of the design of this work.[15] It is important to perceive the concerto's relationship to the chromatic scale on a first or second listen; however, this composition is sonically dense, making it difficult for singular musical gestures to grab a listener's attention. Therefore, in order to achieve suspension of disbelief with a simple chromatic ascent, the ascent must be clearly perceivable. *CE 1q* and *CE 1r* are indeed audibly discernable – a direct result of their musical construction. The unique musical mechanics of *CE 1q* and *CE 1r* that allow for the breaking of the "fourth wall" are the first topic of this chapter. The second topic of this chapter explains how *CE 1q* and *CE 1r* are able to connect c*hromatic events* to each by contributing to a slowly unfolding chromatic framework.

CE 1q – CE 1r: Mechanics

Intervallic Harmonization of *CE 1q*

CE 1q and *CE 1r* utilize the strength and function of different intervals to extricate themselves from their surrounding sonic environment. Howard Boatwright's

[15] The "fourth wall" is the nonexistent wall between the audience and the ensemble, or any performing group that helps an audience member suspend disbelief. When this wall is "broken", suspension of disbelief becomes difficult, and the assertion here is that Furrer breaks the "fourth wall" with the overt presentation of the chromatic scale. Once the "fourth wall" is broken in this composition, the listener's perception of the music that follows as well as precedes the first perceivable ascent is irrevocably altered.

explanation of intervals in his book *Chromaticism: Theory and Practice* offers a valid view of the theory behind interval strength and use. His work is based on the inherent properties of the overtone series and utilizes the acoustical research of Herman Helmholz and music theory of Paul Hindemith:

> Intervals within the *scenario* will produce different tones, doubling or tripling the fundamental at the octave or double octave. For those intervals already containing an octave duplication of the fundamental (2 or 4), these doublings account for the feeling that such intervals have a *root* tone, more conspicuous than the other notes. The fifth and major third have their lower tones supported in this way. The fourth has support for its upper tone, which enhances the impression that it is the inversion of the fifth, The *[sic]* minor sixth (8:5) also has support for its upper tone, causing it to have the effect of an inversion of the major third.[16] [17]

Figure 3.5 provides the harmonic series of G2 and demonstrates that from an acoustic perspective, perfect fourths and minor sixths exist in the overtone series as dyads7 with the fundamental, lending credence to Boatwright's claim.

CE 1q and *CE 1r* are varied by harmonization with simple intervals. This harmonization accentuates the relationship between the chromatic ascents and the strong pedals present in s*egments 2f* and *2i*. *CE 1q* is harmonized by a minor second, a major second, a perfect fourth, a minor sixth, and the octave while *CE 1r* is harmonized at the minor second, minor third, major third, tritone, and octave. Therefore, the combined harmonization of *CE 1q* and *1r* accounts for all available interval classes. In my view, each harmonization is specifically chosen by Furrer and contributes to perception of the ascents.

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[16] Howard Boatwright, *Chromaticisim: Theory and Practice* (Fayetteville: Walnut Grove Press, 1994), 64-65.

[17] The *scenario* consists of partials 1-6 of the overtone series.

Starting with the initial harmonization, Figure 3.3 shows that the initial pitch class of *CE 1r*, G4, is accompanied by D4, resulting in a [D G] dyad. This dyad is marked with an accent in the score. According to Boatwright, the D4 strengthens G4, individualizing it from the pitch class {F F# G} pedals, dominant in *segment 2f*. In the context of this composition, harmonizing with the D4 is an optimal technique for differentiation as it is both musically effective and in aesthetic alignment with preceding musical material. This perfect fourth dyad also marks the beginning of a divergent ascent against a pitch class {F F# G} pedal, introducing the idea of divergent and convergent motion against the pedal structres.

Convergent and divergent motion are two concepts that can augment the standard types of motion in traditional counterpoint: parallel, similar, contrary, or oblique. Convergent or divergent motion can occur within similar motion, contrary motion, and oblique motion, but not parallel motion. Convergent motion occurs when the interval class between two voices contracts. Divergent motion occurs when an interval class expands. Figure 3.6 contains a graphical representation of convergent and divergent motion. Convergent and divergent motion privilege interval class over pure intervallic relationships, so the tritone interval class represents the locus at which convergent motion turns into divergent motion, and vice versa.

The second dyad in *CE 1q*, a pitch class [G B] dyad, amplifies the codependent relationship between pedals and lines that move against them. The {F F# G} pedal acts as a sort of "home base" for the ascent – a place the ascent could return to comfortably at any moment. Therefore, harmonizing with a strong pitch class extant in the pedal structure, namely G, re-attaches the chromatic ascent to the pedal from which it had

escaped, intensifying the perception of the divergent motion. The pitch class [G B] dyad is followed by an octave tripled D, which signals that the interval class divergence has passed the tritone mark, officially switching to convergent oblique motion and heading towards an inevitable collision with G again.

The following pitch class, Eb, is harmonized with a Bb, a perfect fourth below, emphasizing Eb. Accentuation of pitch class Eb highlights another unique characteristic of the chromatic scale: symmetrical construction. Symmetrical construction of the chromatic scale can be understood a number of ways, shown in Figure 3.7:

- Two [01235] hexachords transposed by a tritone
- Three [0123] tetrachords transposed by major thirds
- Four [012] trichords transposed by minor thirds
- Six [01] dyads transposed by major seconds

Since G, B, and Eb are all emphasized by harmonization, the construction of chromatic ascent by symmetric tetrachords transposed by major thirds is projected throughout the ascent.

The next dyad, pitch class [D E], uses the first dissonant interval in the ascent, a major second, in order to propel the now convergent interval class motion towards unison with the pedal. The pedal structure in *segment 2f* gives weight to pitch class G, but includes other pitch classes, notably F and F#. Initially, pitch class G required differentiation in order to diverge from the pedal. Since pitch classes F and F# are present in the pedal, the F and F# within the ascent will need unique identity in order to distinctively converge. This identity is achieved by highlighting the pitch class E with a dissonant major second followed by minor second dissonance in the pitch class [F F#]

dyad. The dissonant sonorities intensify the convergence into pitch class G while delineating the pitch class F and F# from the pedal. Interestingly, the pitch class G arrival is not harmonized, but, by nature, it shares the same problem with the initial G: it is inherently difficult to separate a pitch class when it exists in a pedal structure.

One explanation for the lack of harmonization is that a secondary effect of emphasis with dissonance is that the actual unison arrival on pitch class G, completing the chromatic loop, requires less attention. Another explanation lies in the second to last note of the complete ascent, a pitch class [F Bb] dyad. This dyad, in conjunction with the pitch class [F F#] dyad, which emphasizes pitch class F#, and the pitch class [Eb Bb] dyad implies a second, slower chromatic descent, within the chromatic ascent, of transposed symmetric thirds. This descent can be represented as T7 pitch class {0 4 8} and T6 {0 4 8} operation, resulting in the following pitch classes: {G B D#/Eb F# D# A#/Bb}. Figure 3.8 shows a reduction of this hidden descent, demonstrating that within any chromatic ascent or descent, there are unique hidden descents or ascents that can be accentuated, in this case through harmonization.

Intervallic Harmonization of *CE 1r*

CE 1r utilizes the same variation techniques as *CE 1q*, but includes additional intervals: the tritone and the minor third, shown in Figure 3.9. *CE 1r* occurs over a pitch class {G# A} pedal rather than a {F F# G} pedal. The minor third in *CE 1q* occurs as a pitch class [F# A] dyad during the convergent phase of ascent, performing a function similar to the [G B] dyad in *CE 1q*. The tritone is planed up a minor second from the pitch class [D G#] dyad to [Eb A]. The planing and construction of these two tritones

serves two functions: they highlight the tritone arrival of the ascent, and attach back to the pitch class {G# A} pedal. Emphasizing the tritone arrival signals that the ascent is about to switch from divergent to convergent motion. While *CE 1r* begins and ends in a state of divergence, *CE 1q* begins in a state of divergence and converges into the pedal, ending in unison. The final thirty-second note of *CE 1r* consists of an octave doubled pitch class A, with a G# highlighting the arrival of the ascent on A.

Transformation from *CE 1q* to *CE 1r*

The *CE 1q* sub-group, even though it only contains two events: *CE 1q* and *CE 1r*, demonstrates the important subject of *chromatic event* transformation. The analysis above shows that the important differences between *CE 1q* and *CE 1r* are:

- The intervals used in the dyad harmonization
- The starting point, content, and length of the ascent
- The pedal over which each ascent occurs

These three attributes demonstrate the following principles:

- No *chromatic event* recurs in this composition in an unvaried form
- The range in which variation occurs between related *chromatic events* contained in *CEGs* or *CE* sub-groups is extremely narrow
- The transformations that do occur between these *chromatic events* are extremely influential

Usually, the first instance of a *CEG* or *CE* sub-group is the most varied instance in the composition, but due to the important formal function of breaking the fourth wall, *CE 1q* is the clearest unvaried presentation of these two *chromatic events.* *CE 1r* is varied, since

it uses different interval classes to harmonize and continues the line presented by *CE 1q*. These variations strengthen the identity of the *CE 1q* sub-group over time. Combined, *CE 1q* and *1r* result in one long chromatic ascent comprised of two pitch class loops of the chromatic collection, demonstrated in Figure 3.10.

The clear identity of the *CE 1q* sub-group is the result of an iterative loop of *chromatic event* transformation from *CE 1q* that allows related *chromatic events* to self-define, relating back to my proposed work-idea: identity through iterative loops. The material in *CE 1q* is transformed by a loop that queries identity of the *Konzert* and of *CE 1q* in order to generate the transformations used in *CE 1r*. Figure 3.11 shows one graphical representation of the transformational loop process. Each *chromatic event* in this composition is the result of an iteration of a *chromatic event* transformation loop.

The analysis above demonstrates an additional important concept: Furrer is composing with properties and systems naturally occurring in the chromatic scale, not simply with notes or motives. The ordered chromatic collection is so integral to this composition that it must be pushed to its musical limits, its inherent properties must be understood, varied, and exploited in a rigorous and thorough fashion in order to generate a wide variety of connected musical material while retaining a depth of musical interest.

CE 1q – CE 1r: Framework

In addition to projecting a clear chromatic ascent, *CE 1q* contributes to a long-scale chromatic framework that connects *segment 2d* through *2g*. Table 3.1 shows text reductions of the *chromatic events* in *segments 2g* through *2d*.[18] In order to understand

[18] Appendix A provides critical information for identifying *chromatic events* in the score.

the function of this chromatic framework, all of the *chromatic events* in these *segments* must be first identified and discussed.

Segment 2d

Figure 3.12 is an excerpt from the score, demonstrating the seven *chromatic events* that occur in *segment 2d*:

1) *CE 4k* – a sustained fifteen-count pitch class [D# E] dyad that enters in measure 141[19]
2) *CE 6c* – an eleven thirty-second note ostinato using pitch collections (PCo) 12 and PCo 12a occurring at two transposition levels[20]
3) *CE 7i* – a pitch class {D# E} twenty-seven thirty-second note ostinato in the solo piano
4) *CE 8n* – a thirty-second note level articulated pedal on pitch class D#
5) *CE 8p* – a five sixteenth note ostinato articulated pedal on pitch class D
6) *CE 8o* – a sixteenth note quintuplet level vertical articulated pedal dyad on pitch classes [Eb E]
7) *10g* – a sixteenth note sextuplet level moving articulated pedal glissando in the strings that starts as a pitch class [Eb E A Bb] tetrachord and expands, like a wedge to a pitch class [E F Bb B] tetrachord.

These chromatic events account for all the music in *segment 1d* except the bowed A7 crotale in the second percussion part.

[19] *CE 4k* is one of a very few *chromatic events* in this composition that occur in only part of a *segment* as opposed to an entire *segment*.
[20] Tables 3.2 and 3.3 contain full transpositions of PCo 12 and 12a.

The defining sonority in *segment 2d* is *CE 7i*, the solo piano arpeggiation, which shares pitch classes with all other accompanying *chromatic events*. *CE 6c, 7i,* and *8n* take place on the rhythmic level of the thirty-second note, creating a rhythmically varied web of *chromatic events*. *CE 6c* functions as a moving pedal, churning against the pitch class {Eb D} arpeggios of *CE 7i* while converging into and passing through the pitch class Eb of *CE 8n*. Another pedal event, *CE 8p*, has the least weight in the *segment* due to its weak orchestration and slower rate of speed. *CE 8p* phases with the hemiolas created by the eleven-note and twenty-seven thirty-second note ostinati in *CE 7i* and the arrhythmic ostinato of *CE 6c,* resulting in a level of rhythmic dissonance on the sixteenth note rhythmic level. *CE 8o* contributes to this shifting pedal by sharing pitch classes and adding a degree of rhythmic dissonance to the texture.

Pitch-centricity is elusive in highly chromatic environments, but in these *segments*, a degree of centricity is established by pitch class repetition. Just counting the static pedals in *segment 2d,* there are 145 instances of pitch class E and 113 instances of Eb in S*egment 2d.* Therefore, *segment 2d* is centric around pitch classes Eb and E. The additional thirty-two instances of pitch class E combined with the E-favored orchestration of *CE 4k* to give preference towards E in the final two measures in *segment 2d*. Additionally, *CE 10g* provides the impetus to move from *segment 2d* to *segment 2e* with the articulated passing up and down the pitch class {Eb E} pedal.

Segment 2e

Six active *chromatic events* account for the entirety of the music in *segment 2e*: *CE 4l*, *CE 6d*, *CE 7j*, *CE 8q, CE 9h*, and *CE 10h* shown in Figure 3.13. All of these

events are variants of *chromatic events* presented in *segment 2d*. Five of these *chromatic events* are static in pitch class content and one, *CE 6d,* presents varied pitch class content. The pitch classes of the arpeggiated piano parts, *CE 7j,* shift from pitch class {Eb E} in *CE 7i* to {F F#}, demonstrating ascent of a major second from *segment 2d* to *segment 2e*. The resulting pitch class collection forms a T3 {0123} tetrachord. The chromatic scale can be understood as six dyads transposed by major seconds or three tetrachords transposed by major thirds; therefore, the presence of a chromatic tetrachord can suggest a larger chromatic framework. The broken arpeggiated variant of *CE 8o, CE 8q,* follows the major second planning of *CE 7i* to *CE 7j* but includes pitch class E in *segment 2e*. Pitch classes that elide into succeeding *segments* employ a suspension-like function.[21] *CE 8n* switches to a sustained pedal dyad in *segment 2b,* moving from pitch class Eb to {F F#}. The rhythmic profile and opposing tetrachord structure of *CE 10g* continues in *CE 10h*, but shifts from the string family to the winds and does not glissando upwards. Each tetrachord contains a tritone separated by a minor second: pitch class [B C F F#] and [C C# F# G], or (T0 [0167]). While PC 4 in *CE 8q* resembles a suspension, the T0 [0167] corresponds to an anticipation, alluding that *segment 2f* will feature a pitch class G-based sonority. This anticipation is heightened by the pitch class [F F# G] sustained pedal, *CE 4l.* The final event of this segment, *CE 6d*, is similar to *CE 6c* but varied by transposition. *CEG 6* contains a highly varied yet unified group of *chromatic events*. Chapter 6 includes an extensive analysis of *CEG 6*, but the chromatic framework from *segment 2d* through *segment 2g* relies heavily on *CE 6c*. Therefore, basic concepts of *CEG 6* must be presently examined.

[21] Anticipation and suspension are used loosely here without regard to their resolution.

Attributes of *CEG 6*

All *chromatic events* contained in *CEG 6* share certain characteristics, which can be demonstrated by examining *CE 6d*. *CE 6d* is a two-voice *chromatic event* in the first and second clarinets comprised of varied ostinati that repeat every ten thirty-second notes. Variation of the core ostinati used to generate *CE 6d* throughout *segment 2e* occurs three ways: rest substitution, transposition, and pitch collection alternation. *CEG 6* events can be very challenging to identify, due to seemingly random or unique patterns created by rest substitution.[22] However, once identified, the construction of the ostinato can be inferred, shown in Figure 3.14. The inferred ostinato allows us to say that *CE 6d* is constructed by transposing varied ostinati by ascending minor seconds. The first clarinet part is generated by transpositions of PCo 3 while the second clarinet alternates between PCo 3 and 3a.[23] The core ostinato of *CE 6d* is transposed in a full chromatic ascent of T0 – TE of PCo 3 in the first clarinet and T7 – T6 PCo 3 (sometimes PCo 3a) in the second clarinet for the duration of *segment 2e*.[24] Secondary ascent notes are omitted in T9, TE, T4, and T6 of the second clarinet part, obscuring which PCo is used. PCo 3 and PCo 3a consist of the same order of pitch classes except the pitch class in position nine. This pitch class is a major second higher in PCo 3a, resulting in a secondary chromatic ascent, shown in the lowest stave in Figure 3.14. This secondary chromatic rise reinforces the chromatic framework, which is especially important in the case of the first ostinati, whose first pitches are eliminated through rest substitution.

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[22] Rest substitution is used throughout this concert to vary material and can be viewed as one way of connecting the wind and brass parts to the piano part. Wind and brass players need to breath every so often, so there would be no way for them to play full ostinato in *CEG 6* events.

[23] For reference, Table 3.4 illustrates all PCos used in this composition and Tables 3.5 and 3.6 provide complete transpositions for PCo 3 and PCo 3a. All PCos are expressed in pitch class.

[24] The lower voice uses PCo 3a for T7 and T8, T1, T2, T3, and T5 while PCo3 is used in T10 and T0.

Segments 2f and *2g*

While pedal structures dominate *segments 2d* and *2e*, the ascent of *CE 1q* defines *segment 2f* as it climbs over pedals *7k*, *CE 8r, CE 8s,* and *CE 8t*.[25] The non-pedal event, *CE 6e,* is varied by voice addition and intervallic expansion and contraction in addition to the transposition and rest substitution mentioned above. *CE 6e* begins with the second violin, viola, and 'cello planing a second inversion major triad for one measure. The lower voices contract over the next two measures, ending with planing of major seconds in measure 153. The intervallic contraction clearly demonstrates parallel convergent motion. This cycle occurs twice more: measure 154 – 155, and measures 157 – 159. The first violin enters in measure 157, adding an extra voice and further varying this *chromatic event*.[26] All these ostinati use PCo 4, given in Table 3.7, but are so highly varied that there is no discernable pattern in the final three measures. Unlike other events in *CEG 6*, these ostinati seem to restart, further obscuring their patterns. Extreme variation of *CE 6e* helps balance out the strict, clear chromatic presentation of *CE 1q*.

Segment 2g is comprised of only four *chromatic events*, all variants of events mentioned previously: *CE 6f, 8u, 9i,* and *10i*, shown in Figure 3.16. *CE 6f* is more varied than other *CEG 6* events already discussed and is the defining material for *segment 2g.* This *chromatic event* is a combination of the octave displacement of *CE 7i, 7j,* and *7k* and the transposed ostinao similar to *CE 6d*. *CE 6f* contains material generated from a PCo 1-based ostinato that moves up by semitone every fifteen thirty-second and is lightly varied by rest substitution.[27] PCo 1 is the most important pitch collection in the composition, as

[25] All these *chromatic events* are identified in Figure 3.15.
[26] Voices in *CEG 6* are never truly independent, resulting in intensified harmonization rather than polyphony.
[27] Table 3.8 provides complete transpositions for PCo 1.

it is the only complete pitch collection shared between the piano and the rest of the ensemble. Additionally, nearly all of the pitch collections have a relationship with PCo 1. PCo 2, 3, 3a, 4, 6, 7, 8, 9, and 11 all share the first tetrachord of PCo 1; PCo 12 and 12a have the same tetrachord {0213} as the second through fifth ordered notes of PCo 1. PCo 1 helps to unify different *chromatic events* since many of these collections share the same opening tetrachord as PCo 1.

CE 8u has special importance in this section, as it continues the idea of chromatic ascents of minor dyads, but this time without piano arpeggiation and the ascent of the dyad is only a minor second, not a major second. *Segment 2g* is the first moment in *Section 2* where the solo or ensemble piano are not performing some form of a minor second dyad. The other two events, *CE 9i* and *10i,* support the articulated {G G#} pedal and help to keep {Bb B} alive as a suspended sonority from the ascent, *CE 1q*, in addition antagonizing each with clashing pitches.

Summary

Now that all the *chromatic events* contained in *segments 2d – 2g* have been identified and explained, a reduction of the chromatic framework that guides these *segments* can be created, shown in Figure 3.17. This example uses the following symbols:

- Articulated pedals are represented by filled in note heads
- Sustained pedals are represented by open note heads
- Straight lines connecting note heads in *CE 10g* represent glissandi
- Sixteenth note rests are used to demonstrate the profile of *CE 10h*

- Slurs are used to indicate anticipations or suspensions
- Arrows indicate where an ascent switches from one *chromatic event* to another
- Vertical brackets identify *chromatic events* split onto multiple staves
- Octave displacement of *chromatic events* has been applied for clarity

Chromatic framework guides multiple *chromatic events* to *CE 8u* resulting in multiple instances of *CE 8u* in the reduction. All *chromatic events* occurring in *segments 2d – 2g* are accounted for in this reduction except for *CE 6e* in *segment 2f*. *Segment*-to-*segment* chromatic framework clearly connects pitch class content between *chromatic events*. For example, the pitch class Bb – B ascent of *CE 10g* continues in the main ascent of *CE 6d*, starting on C in *segment 2e*. At least two different chromatic ascents are occurring in these segments, and they are moving at different speeds.

A further reduction, Figure 3.18, shows with more clarity the existence of a two voice chromatic ascent. In this example, filled in notes represent anticipations, suspension, or rising chromatic lines, while open note heads represent pedals or pitch class center for each *segment*. The primary pedals outline chromatic ascent of a tritone, starting with the pitch class D anticipation, labeled *Chromatic Ascent – D*, while the secondary voice outlines a tritone ascent starting on pitch class A, *Chromatic Ascent – A.* Important secondary ascents, like *Chromatic Ascent – A,* often occur at the perfect fifth in this composition, demonstrated in the secondary ascent of *CE 6d*.

Ascent nesting is present in these *segments* as *Chromatic Ascent – D* and *Chromatic Ascent – A* contain ascents moving at a quicker rate of speed against pedals or other rising lines, resulting in resulting in multiple instances of convergent and divergent motion. A secondary ascent inside of the *Chromatic Ascent – A* occurs as an anticipation

to the arrival on pitch class C# in *CE 6f* in *segment 2d* demonstrated in Figure 3.18. Figure 3.19, a further reduction, shows clearly that two instances of secondary nesting occur in *Chromatic Ascent – D.* Figure 3.19 also demonstrates the connection between *Chromatic Ascent – D* to *Chromatic Ascent – A.* The final tetrachord of the incomplete, secondary ascent in *Chromatic Ascent – D*, pitch class {G# A A# B}, connects to the final pitch class C in the secondary ascent of *Chromatic Ascent – A*.

These reductions above give weight to surface function, but a true pitch class reduction of *segments 2d – 2g* demonstrates pitch class looping present in these *segments*. Figure 3.19 shows this reduction, clearly illustrating that in terms of pitch class, the surface material of *segments 2d – 2g* is simply a result of chromatic cycles occurring at different rates of speed. The slowest ascent occurs from *segment*-to-*segment,* starting with a major second ascent and collapsing to a minor second ascent. Two other cycles move at faster rates of speed: a G-based cycle and a C-based cycle. Each of these cycles moves through the chromatic collection twice, using overlapping pitch classes.

When Figure 3.20 is compared with the actual score of these *segment*s, Figure 3.21, a clear paradox between stasis and motion is revealed. Pitch class looping results in a static texture, but the surface material of these *segments* has clear forward motion towards a goal. Throughout this composition, goal-oriented stasis is achieved through careful balance of the material contained in *chromatic events,* transformation of these *chromatic events*, and a framework consisting of multiple chromatic ascents moving at varying speeds.

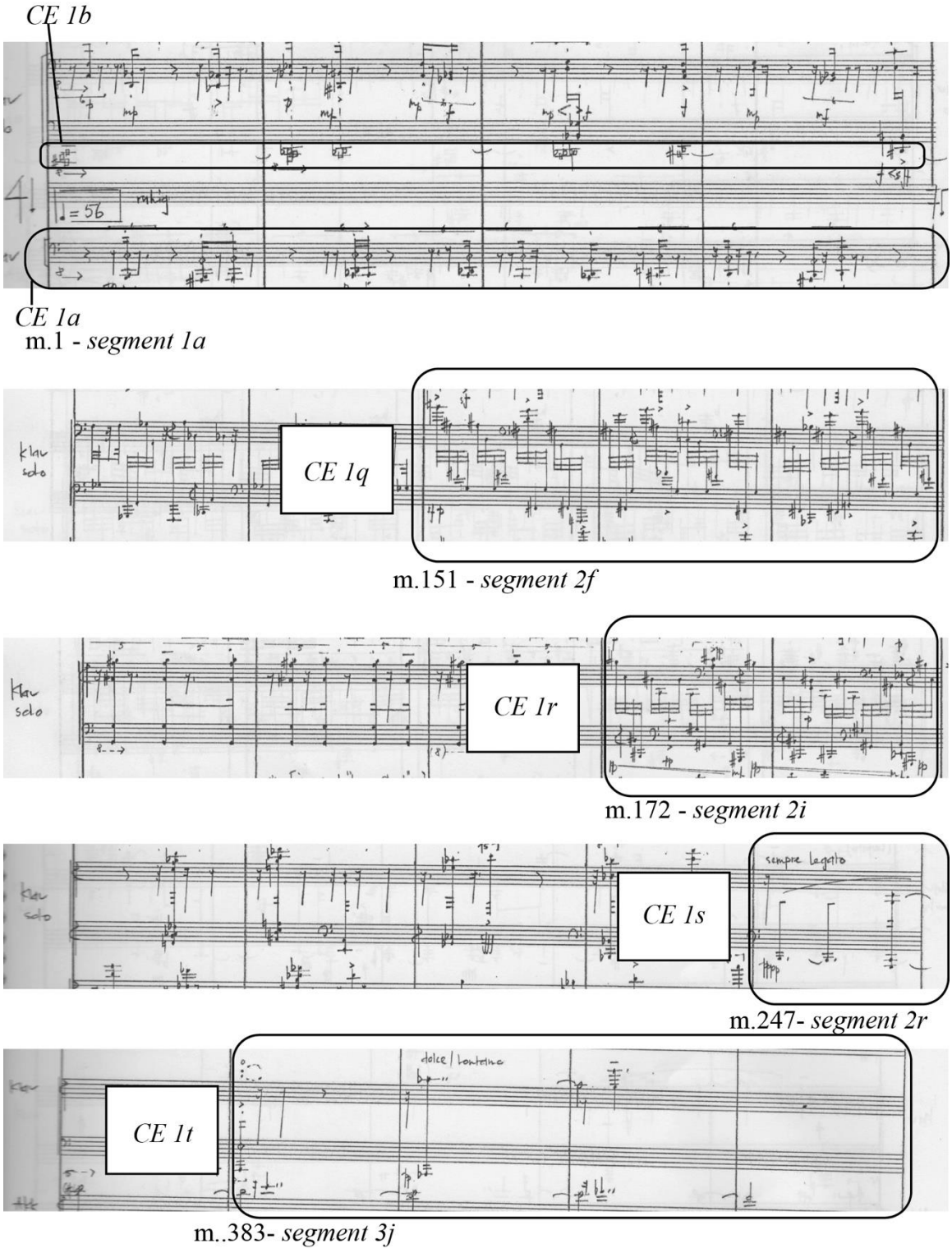


Figure 3.1: First *chromatic events* in the *CE 1a* and *CE 1b* sub-groups, *CE 1q, 1r, 1s, CE 1t* from Beat Furrer's *Konzert für Klavier und Orchester*

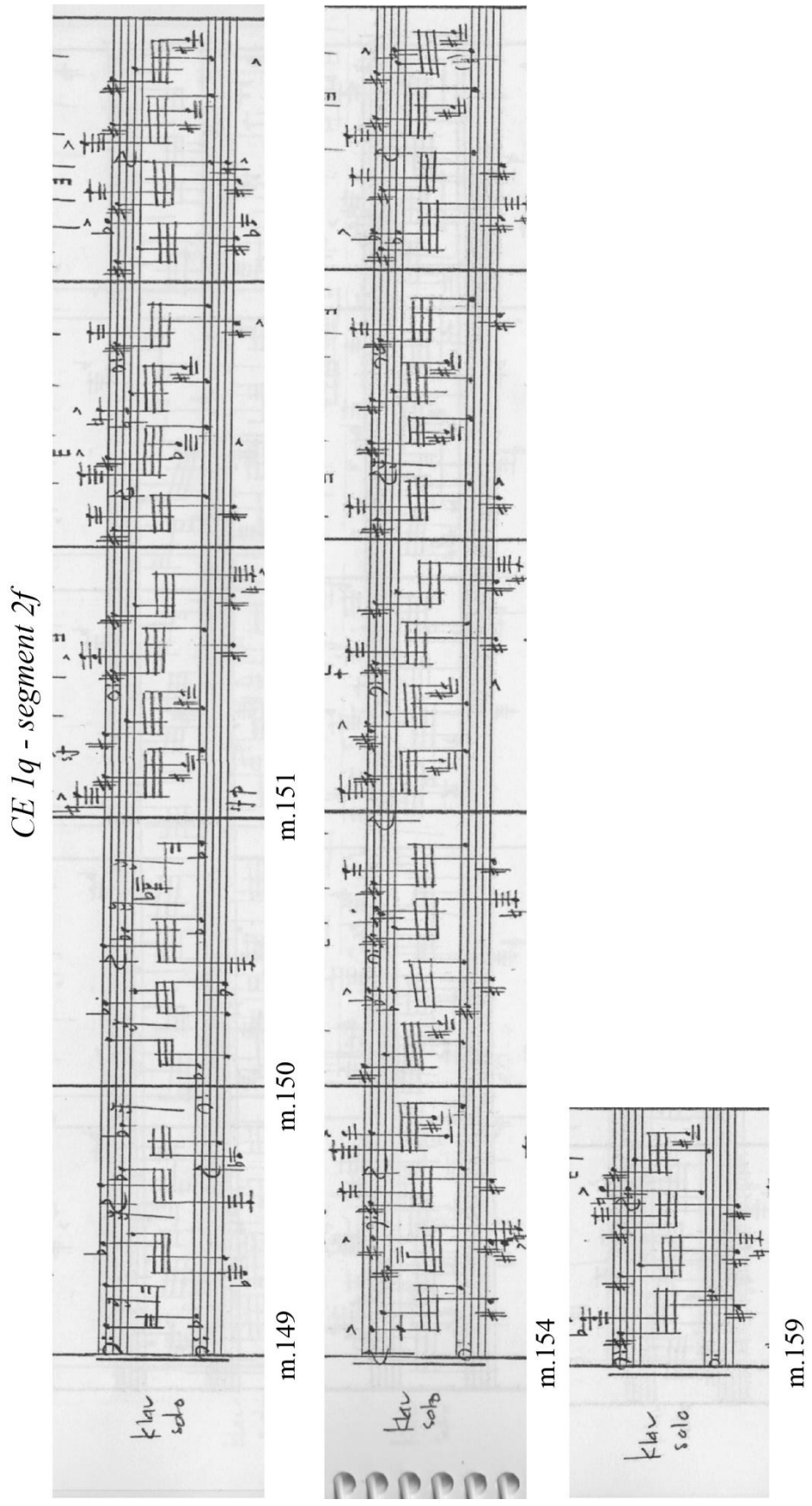


Figure 3.2: *CE 1q* from Beat Furrer's *Konzert für Klavier und Orchester*

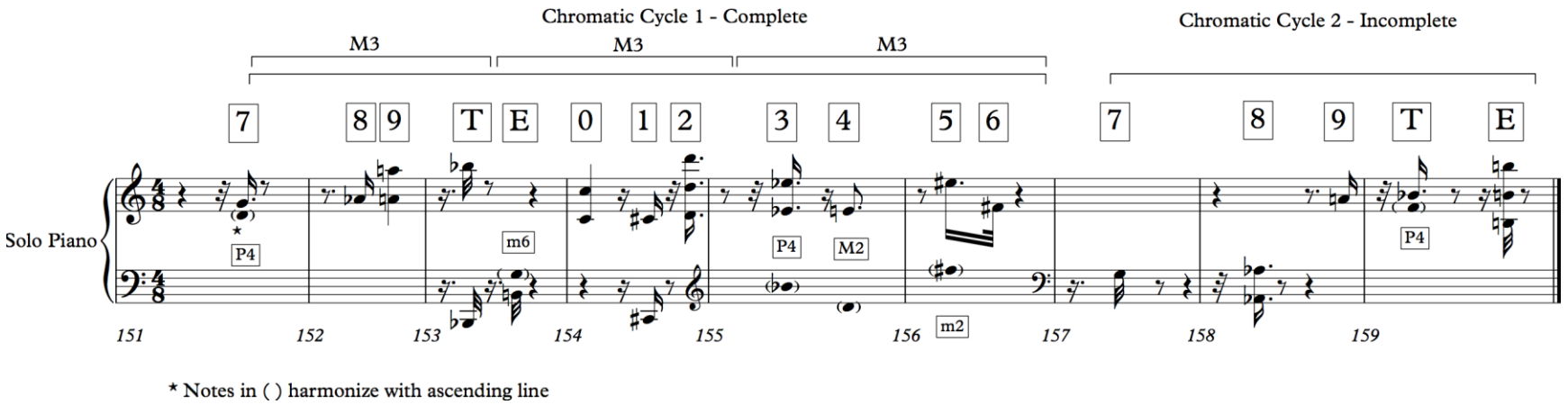


Figure 3.3: Chromatic ascent reduction of *CE 1q* from Beat Furrer's *Konzert für Klavier und Orchester*

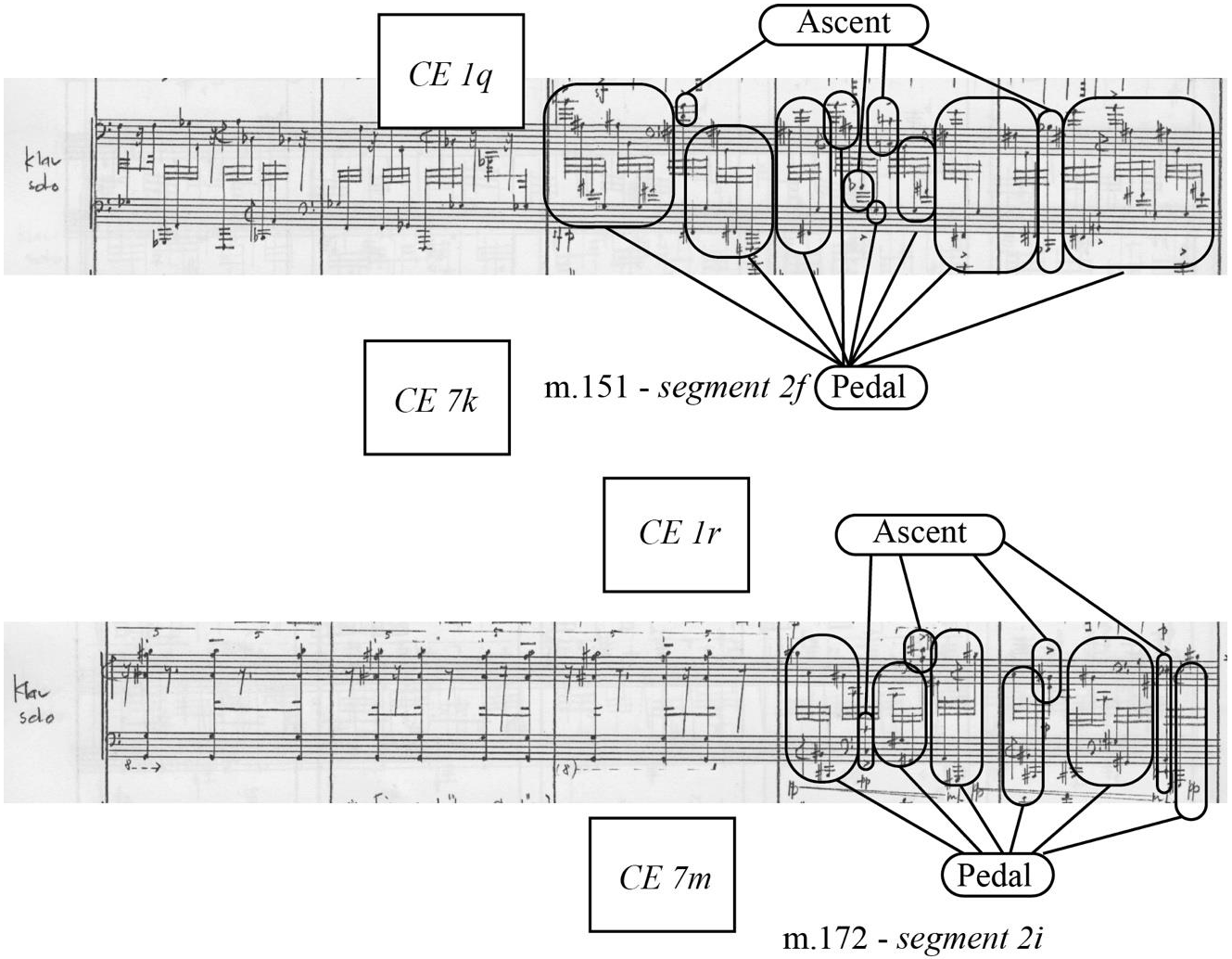


Figure 3.4 Chromatic ascents *CE 1q* and *1r* with arpeggiated pedals *CE 7k* and *7m* from Beat Furrer's *Konzert für Klavier und Orchester*

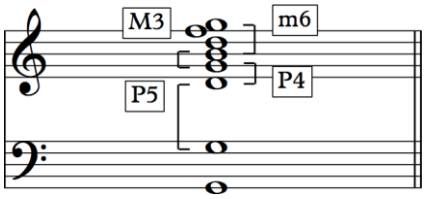


Figure 3.5 Harmonic Series of G2 up to the eighth partial

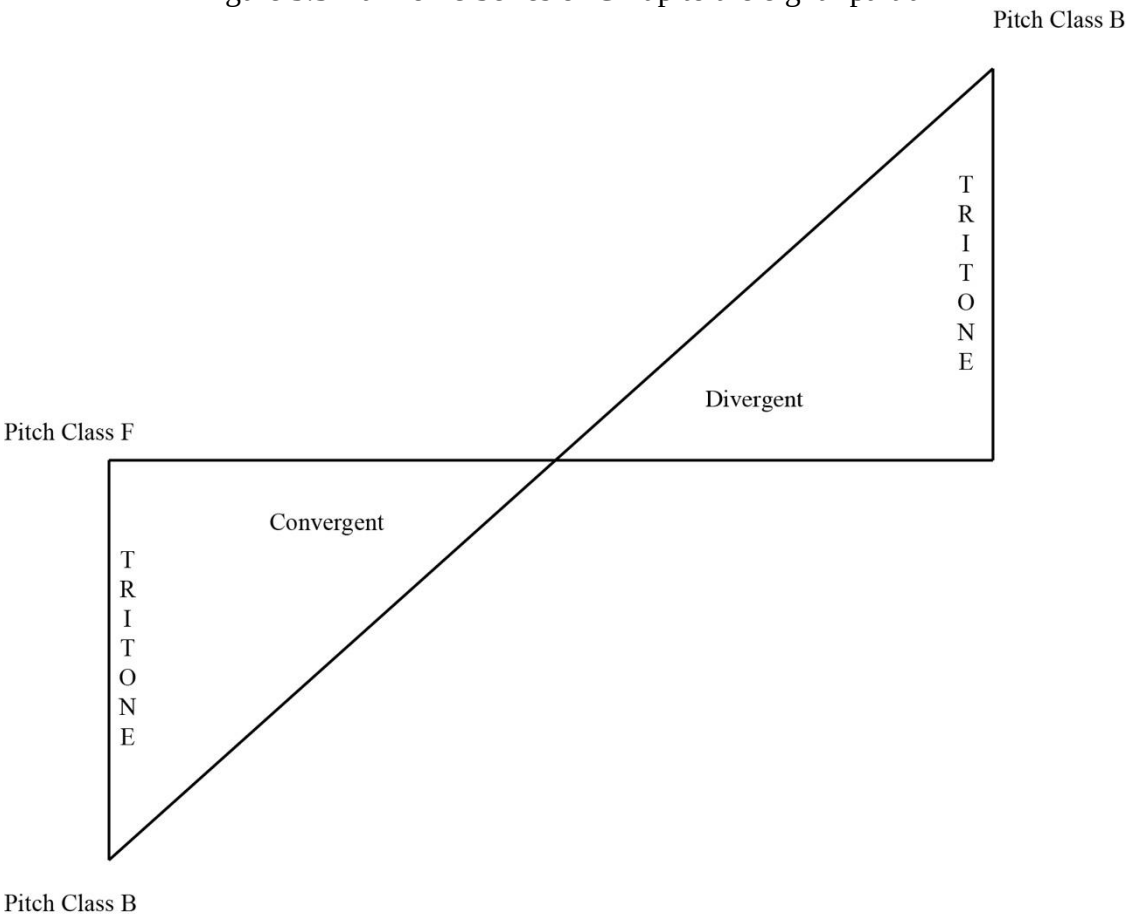


Figure 3.6 Visual representation of convergent and divergent motion.

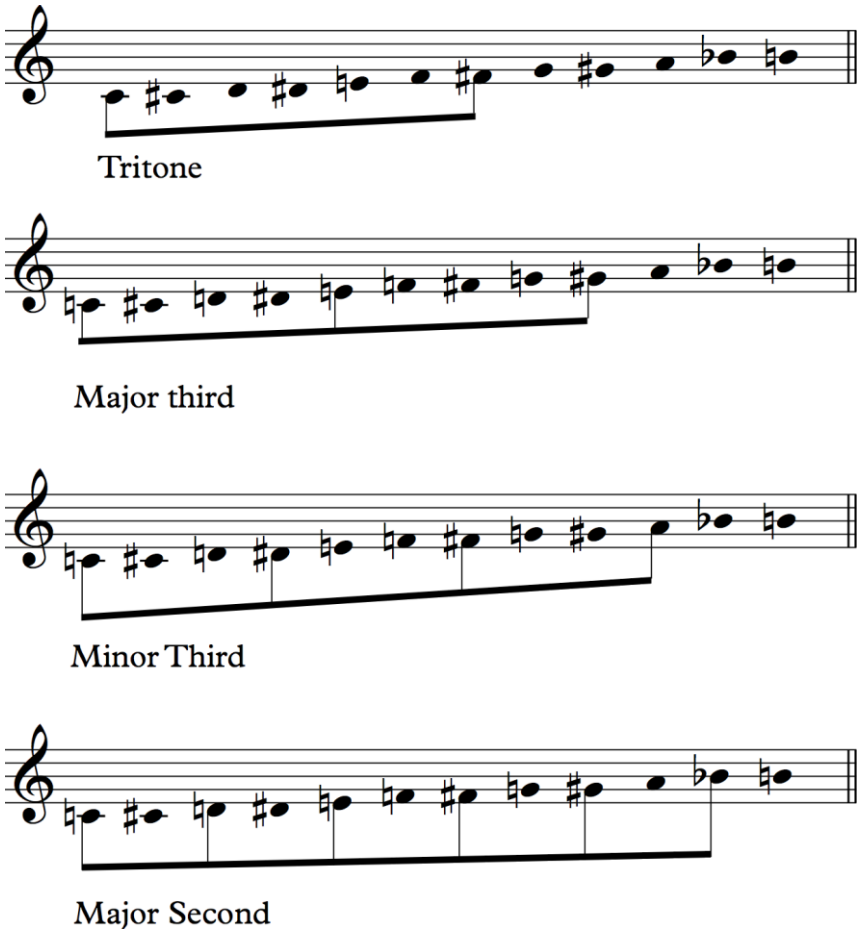


Figure 3.7 Symmetrical division of the chromatic scale

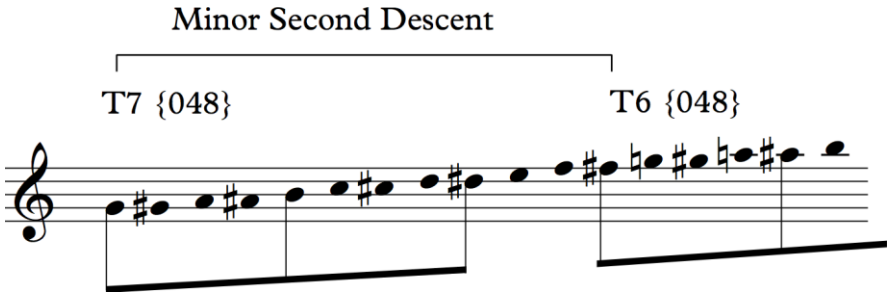


Figure 3.8 Hidden chromatic descent in *CE 1q* from Beat Furrer's *Konzert für Klavier und Orchester*

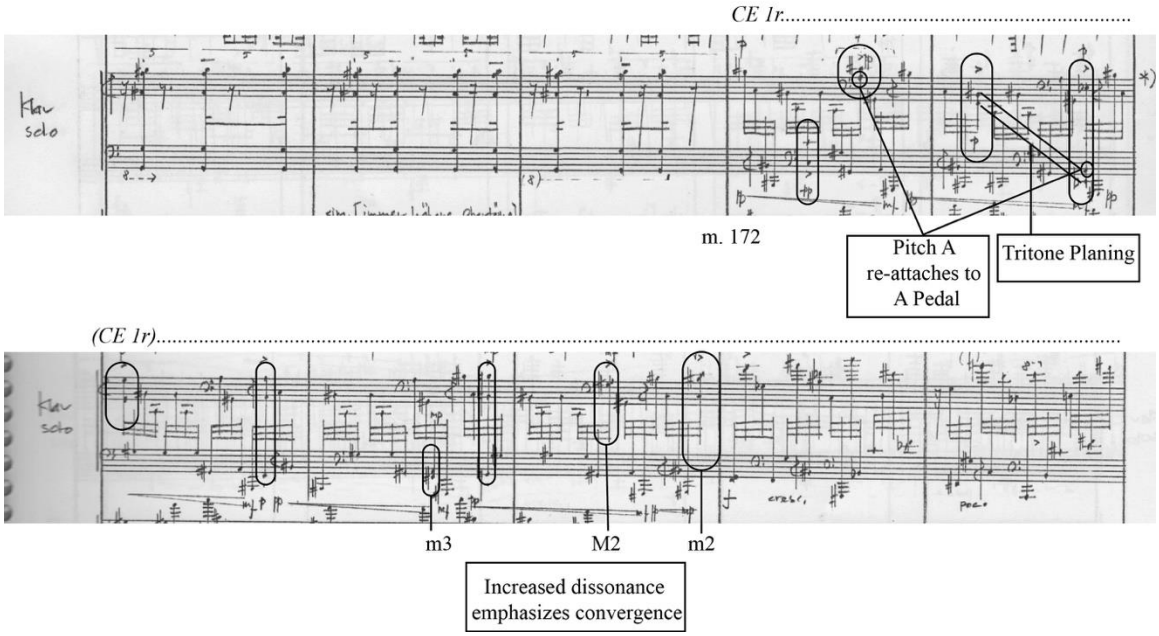


Figure 3.9: Harmonization in *CE 1r* from Beat Furrer's *Konzert für Klavier und Orchester*

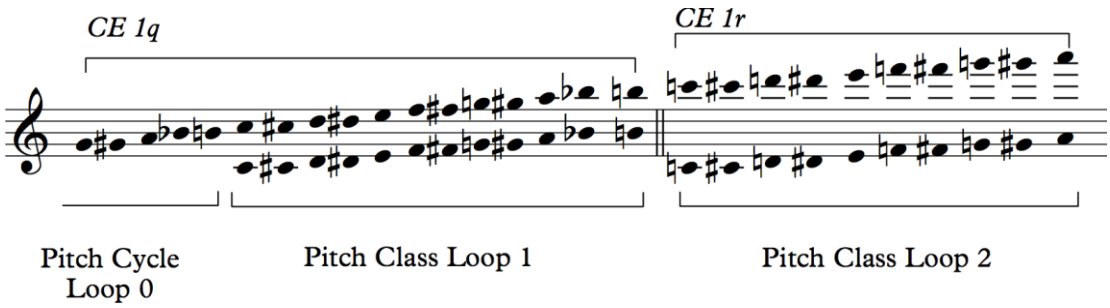


Figure 3.10: Pitch class loop in *CE 1q* and *CE 1r* of Beat Furrer's *Konzert für Klavier und Orchester*

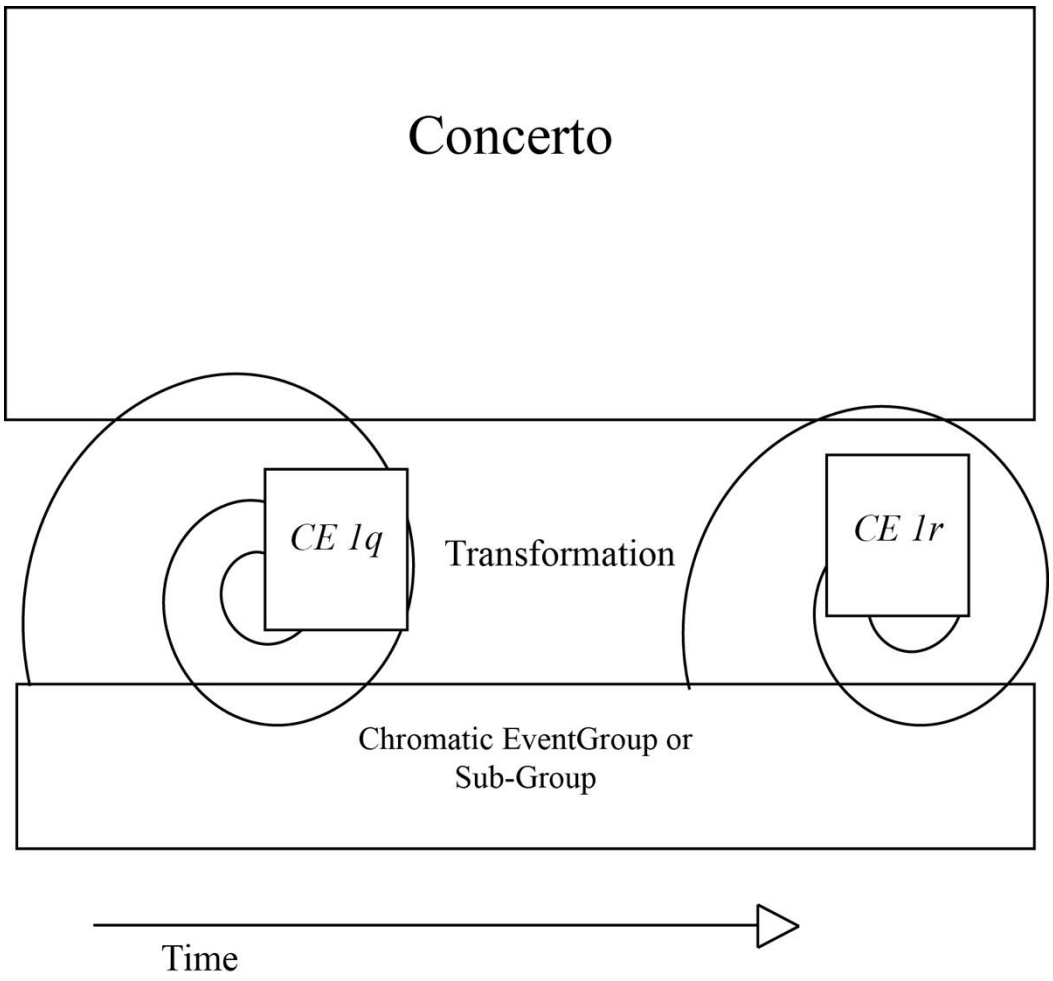


Figure 3.11: *Chromatic event* transformation loops in Beat Furrer's *Konzert für Klavier und Orchester*

Table 3.1: *Segments 2d – 2g* in Beat Furrer's *Konzert für Klavier und Orchester*

mm.	139	140 141 142 143	144	145 146 147 148 149	150	151 152 153 154	155 156 157 158 159	160 161
Segment	2d			2e		2f		2g
Name	Arpeggio III			Arpeggio IV		Arp. V - w/Chromatic Scale I		Rising Arpeggio I
CEG1 PnoChrom						q. 7, 8, 9, T, E, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, T, E		
CEG2 ChromConn								
CEG3 TripletPnoArp								
CEG4 15Sust		k. [34] Sust. Ped.		l. [678] Sustained Pedal				
CEG5 EnsChrom								
CEG6 32Ost	c. T1 PCo 12 + T0 PCo 12a - 11-note Ostinato			d. PCo 3/3a - 10-note Ostinato T0 - TE		e. PCo 4 - 13-note Ostinato - Highly Varied		f. PCo 1 - 15-note Ostinato T0- T4
CEG7 PnoPed	i. {34} - 27-note ostinato			j. {56} - 15-note/12-note Ostinati		k. [567] - 20-note/15-note Ostinati		
CEG8 ArtPed	n./p. 3/2 o. [34]			q. [456]		r./s. 6/7 t. [167]		u. [78]
CEG9 SusPed				h. [56]				i. [45TE]
CEG10 MovPed	g. [349T] Wedge			h. [E056] - [0167]				i. [01236789] - [123468T]

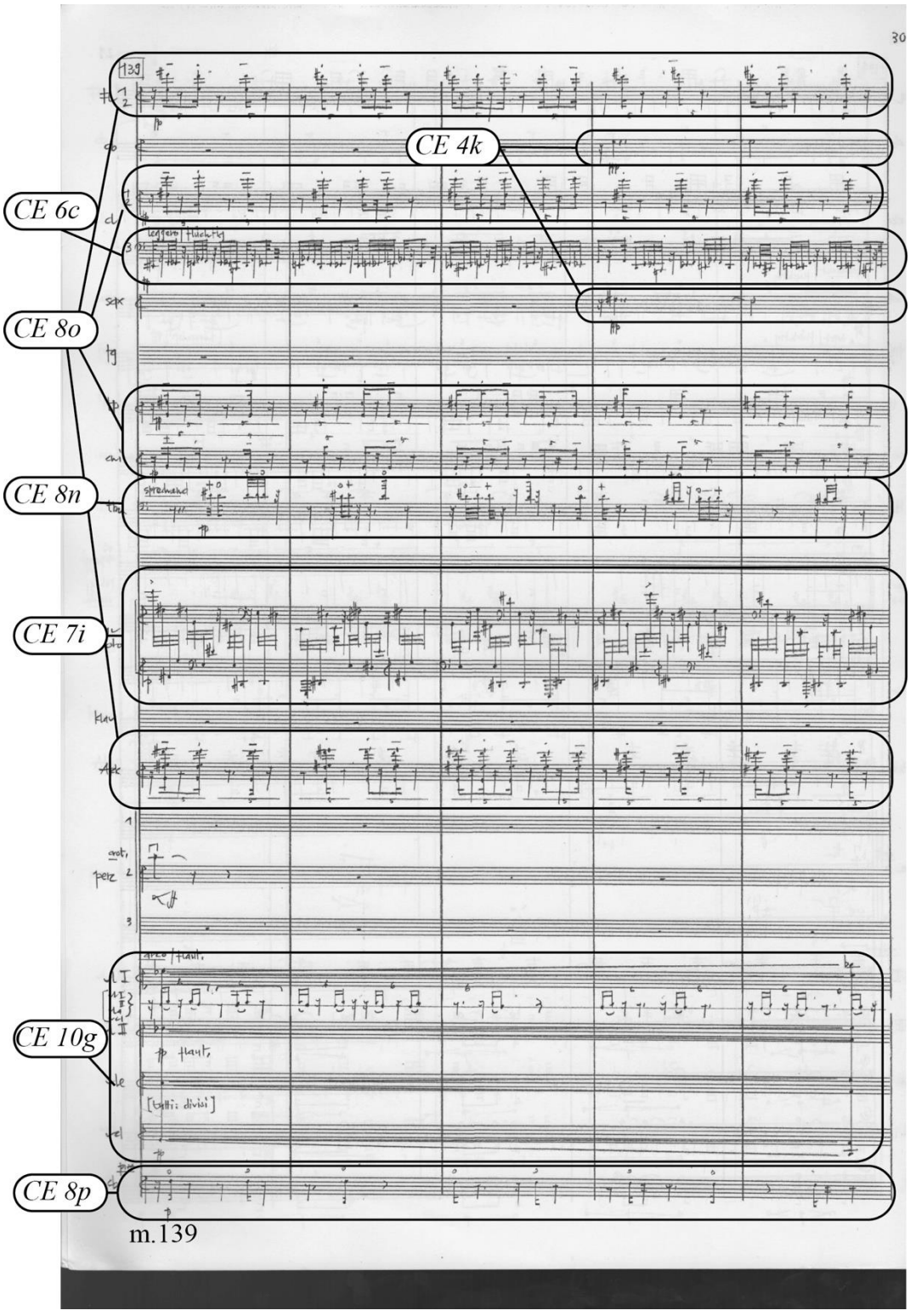


Figure 3.12: Opening Measures of *Segment 2d* from Beat Furrer's *Konzert für Klavier und Orchester*

Table 3.2: PCo 12 used in Beat Furrer's *Konzert für Klavier und Orchester*

Pitch Collection 12										
1	2	4	3	5	4	6	5	3	4	3
2	3	5	4	6	5	7	6	4	5	4
3	4	6	5	7	6	8	7	5	6	5
4	5	7	6	8	7	9	8	6	7	6
5	6	8	7	9	8	10	9	7	8	7
6	7	9	8	10	9	11	10	8	9	8
7	8	10	9	11	10	0	11	9	10	9
8	9	11	10	0	11	1	0	10	11	10
9	10	0	11	1	0	2	1	11	0	11
10	11	1	0	2	1	3	2	12	1	0
11	0	2	1	3	2	4	3	0	2	1
0	1	3	2	4	3	5	4	1	3	2

Table 3.3: PCo 12a used in Beat Furrer's *Konzert für Klavier und Orchester*

Pitch Collection 12a										
0	2	4	3	5	4	6	5	3	4	3
1	3	5	4	6	5	7	6	4	5	4
2	4	6	5	7	6	8	7	5	6	5
3	5	7	6	8	7	9	8	6	7	6
4	6	8	7	9	8	10	9	7	8	7
5	7	9	8	10	9	11	10	8	9	8
6	8	10	9	11	10	0	11	9	10	9
7	9	11	10	0	11	1	0	10	11	10
8	10	0	11	1	0	2	1	11	0	11
9	11	1	0	2	1	3	2	12	1	0
10	0	2	1	3	2	4	3	0	2	1
11	1	3	2	4	3	5	4	1	3	2

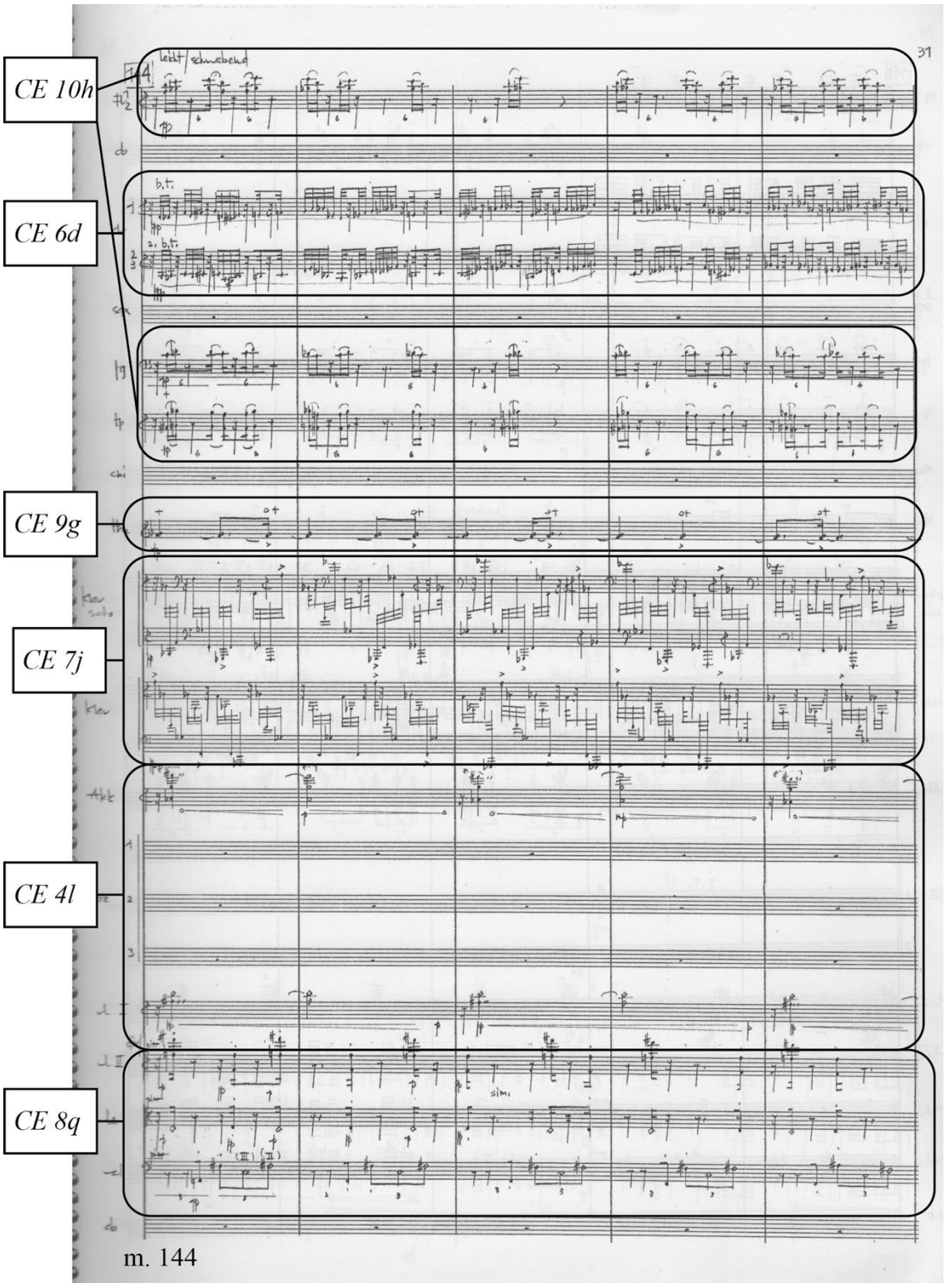


Figure 3.13: Opening measures of *Segment 2e* from Beat Furrer's *Konzert für Klavier und Orchester*

Table 3.4: All pitch collections used in Beat Furrer's *Konzert für Klavier und Orchester*

	All Pitch Collections Used in BFKFP																												
PCo1	0	2	1	3	5	4	6	8	7	6	9	8	10	9	11														
PCo2	0	2	1	3	2	5	4	6	5	2	4	3	5	4	6	5													
PCo3	0	2	1	3	5	4	6	8	7	2																			
PCo3a	0	2	1	3	5	4	6	8	5	2																			
PCo4	0	2	1	3	5	8	7	10	5	4	6	5	2																
PCo5	0	6	8	10	11	1	3	11	2	3	5	7	9																
PCo6	0	2	1	3	2	4	3	5	4																				
PCo7	0	2	1	3	2	4	3	0	2																				
PCo8	0	2	1	3	5	2	4	6	8	9	7	9	8	10	9	11	1												
PCo9	0	2	1	3	2	4	3	5	4	6	5																		
PCo10	0	6	1	8	2	9 7	4	10	5	11 6	0	5	4 11	1 3	2 9	4 0	6	6	1 11	7	8	9	6 3	10 5	11	0	11 6		
PCo11	0	2	1	3	5	1	4	3	5	4	6																		
PCo12	0	1	3	2	4	3	5	4	1	3	2																		
PCo12a	0	2	4	3	5	4	6	5	2	4	3																		
PCo13a	0	1	2	3	4	5	6	7	8	9	10	11																	

Table 3.5: PCo 3 used in Beat Furrer's *Konzert für Klavier und Orchester*

Pitch Collection 3									
0	2	1	3	5	4	6	8	7	2
1	3	2	4	6	5	7	9	8	3
2	4	3	5	7	6	8	10	9	4
3	5	4	6	8	7	9	11	10	5
4	6	5	7	9	8	10	0	11	6
5	7	6	8	10	9	11	1	0	7
6	8	7	9	11	10	0	2	1	8
7	9	8	10	0	11	1	3	2	9
8	10	9	11	1	0	2	4	3	10
9	11	10	0	2	1	3	5	4	11
10	0	11	1	3	2	4	6	5	0
11	1	0	2	4	3	5	7	6	1
1	2	3	4	5	6	7	8	9	10

Table 3.6: PCo 3a used in Beat Furrer's *Konzert für Klavier und Orchester*

Pitch Collection 3A									
0	2	1	3	5	4	6	8	5	2
1	3	2	4	6	5	7	9	6	3
2	4	3	5	7	6	8	10	7	4
3	5	4	6	8	7	9	11	8	5
4	6	5	7	9	8	10	0	9	6
5	7	6	8	10	9	11	1	10	7
6	8	7	9	11	10	0	2	11	8
7	9	8	10	0	11	1	3	0	9
8	10	9	11	1	0	2	4	1	10
9	11	10	0	2	1	3	5	2	11
10	0	11	1	3	2	4	6	3	0
11	1	0	2	4	3	5	7	4	1
1	2	3	4	5	6	7	8	9	10

Figure 3.14: *CE 6d* with secondary chromatic ascent from Beat Furrer's *Konzert für Klavier und Orchester*

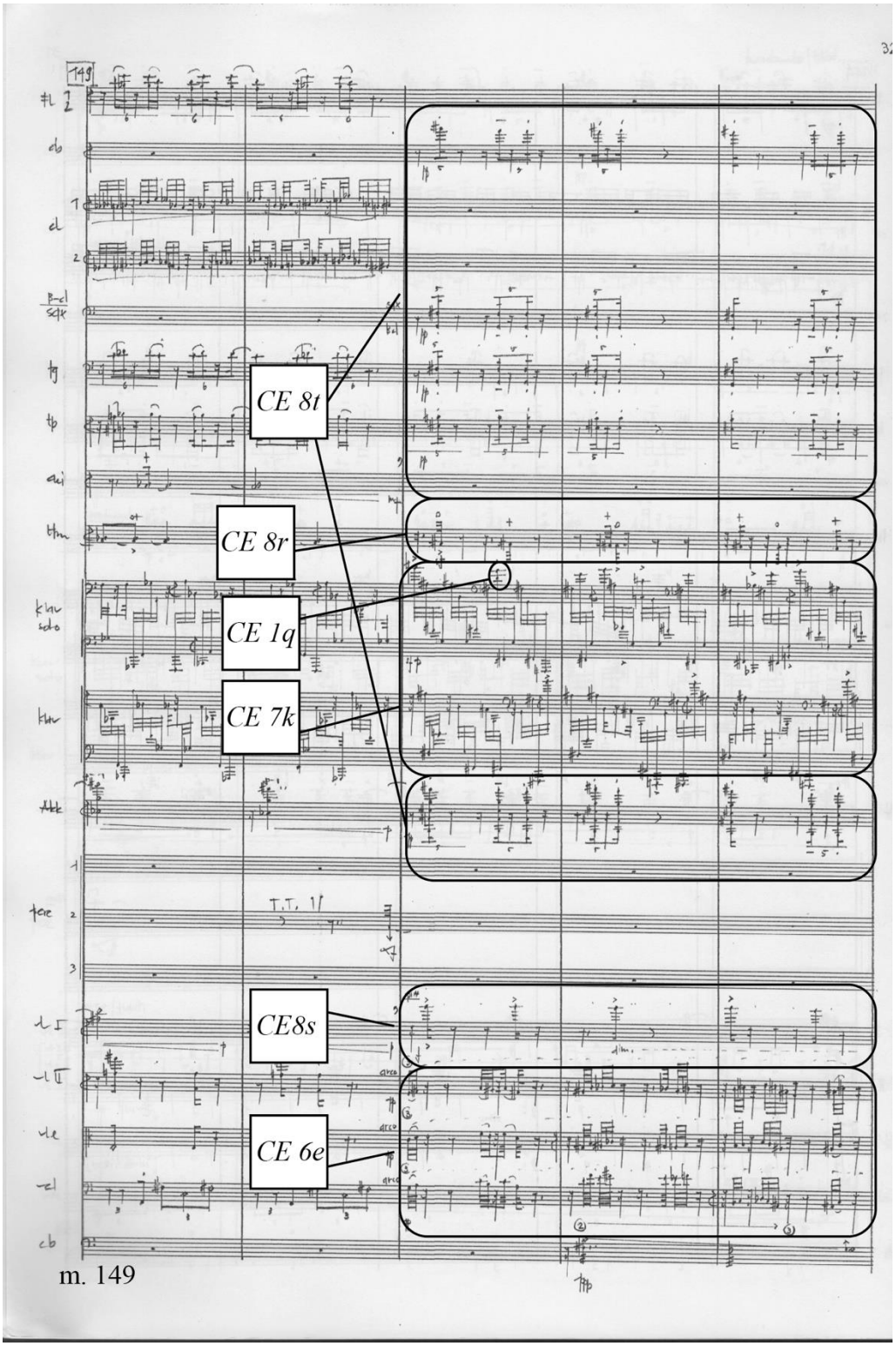


Figure 3.15: *Segment 2f* from Beat Furrer's *Konzert für Klavier und Orchester*

Table 3.7: PCo 4 used in Beat Furrer's *Konzert für Klavier und Orchester*

Pitch Collection 4												
0	2	1	3	5	1	4	3	5	4	6	5	2
1	3	2	4	6	2	5	4	6	5	7	6	3
2	4	3	5	7	3	6	5	7	6	8	7	4
3	5	4	6	8	4	7	6	8	7	9	8	5
4	6	5	7	9	5	8	7	9	8	10	9	6
5	7	6	8	10	6	9	8	10	9	11	10	7
6	8	7	9	11	7	10	9	11	10	0	11	8
7	9	8	10	0	8	11	10	0	11	1	0	9
8	10	9	11	1	9	0	11	1	0	2	1	10
9	11	10	0	2	10	1	0	2	1	3	2	11
10	0	11	1	3	11	2	1	3	2	4	3	0
11	1	0	2	4	0	3	2	4	3	5	4	1
1	2	3	4	5	6	7	8	9	10	11	12	13

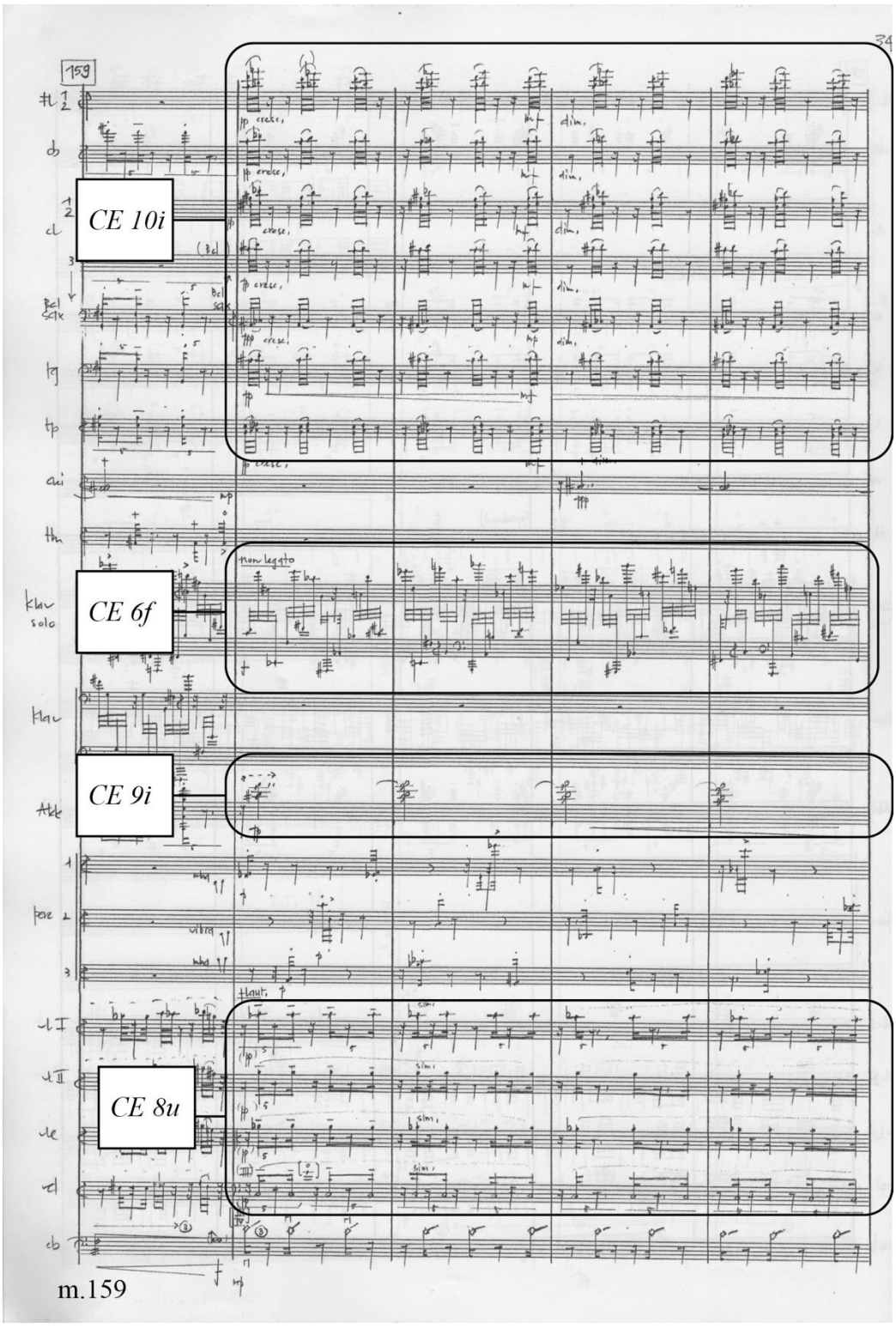


Figure 3.16: Opening measures of *Segment 2g* from Beat Furrer's *Konzert für Klavier und Orchester*

Table 3.8: PCo 1 used in Beat Furrer's *Konzert für Klavier und Orchester*

Pitch Collection 1														
0	2	1	3	5	4	6	8	7	6	9	8	10	9	11
1	3	2	4	6	5	7	9	8	7	10	9	11	10	0
2	4	3	5	7	6	8	10	9	8	11	10	0	11	1
3	5	4	6	8	7	9	11	10	9	0	11	1	0	2
4	6	5	7	9	8	10	0	11	10	1	0	2	1	3
5	7	6	8	10	9	11	1	0	11	2	1	3	2	4
6	8	7	9	11	10	0	2	1	0	3	2	4	3	5
7	9	8	10	0	11	1	3	2	1	4	3	5	4	6
8	10	9	11	1	0	2	4	3	2	5	4	6	5	7
9	11	10	0	2	1	3	5	4	3	6	5	7	6	8
10	0	11	1	3	2	4	6	5	4	7	6	8	7	9
11	1	0	2	4	3	5	7	6	5	8	7	9	8	10
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

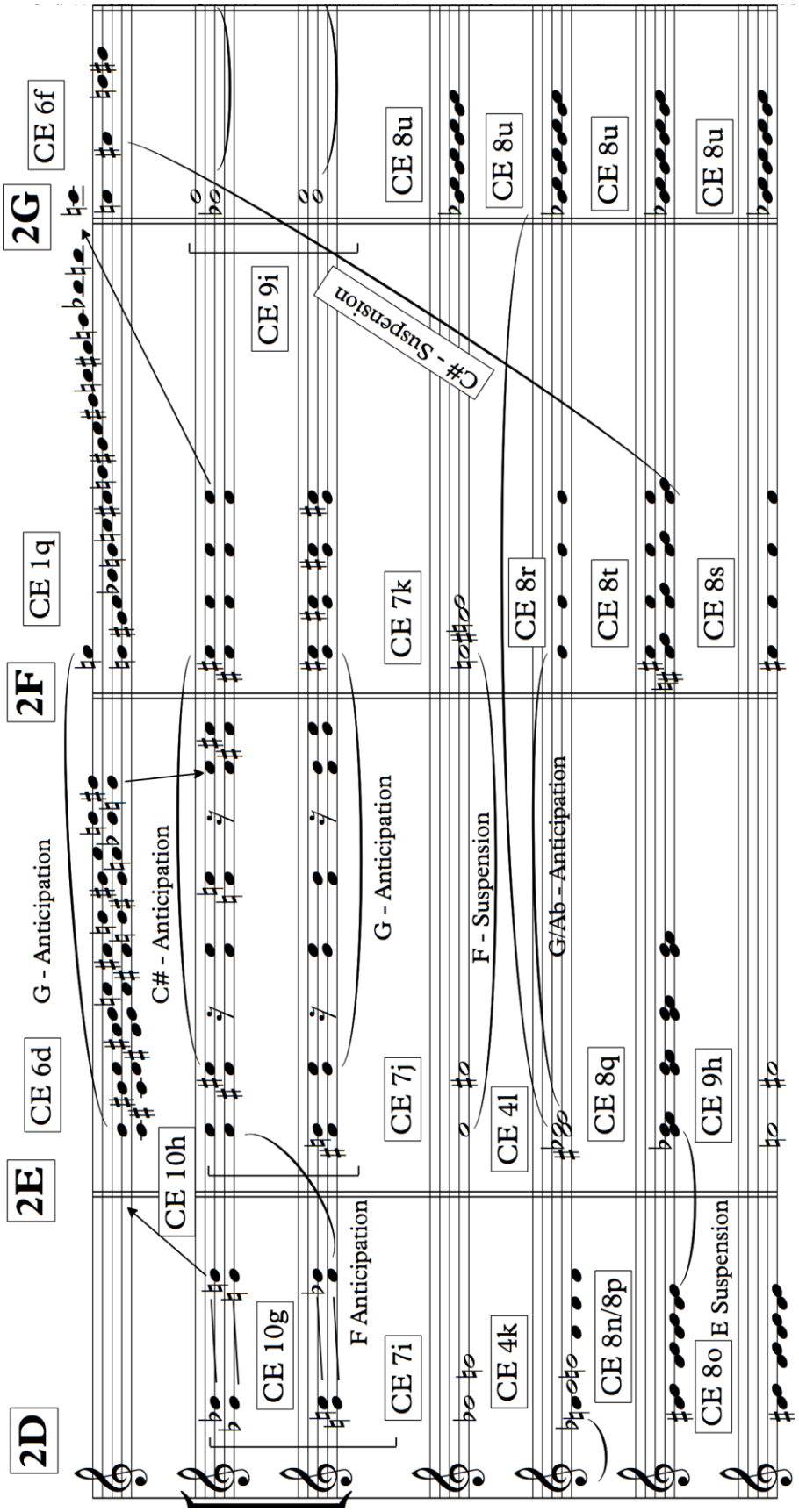


Figure 3.17: Reduction of *segment 2d-2g* of Beat Furrer's *Konzert für Klavier und Orchester*

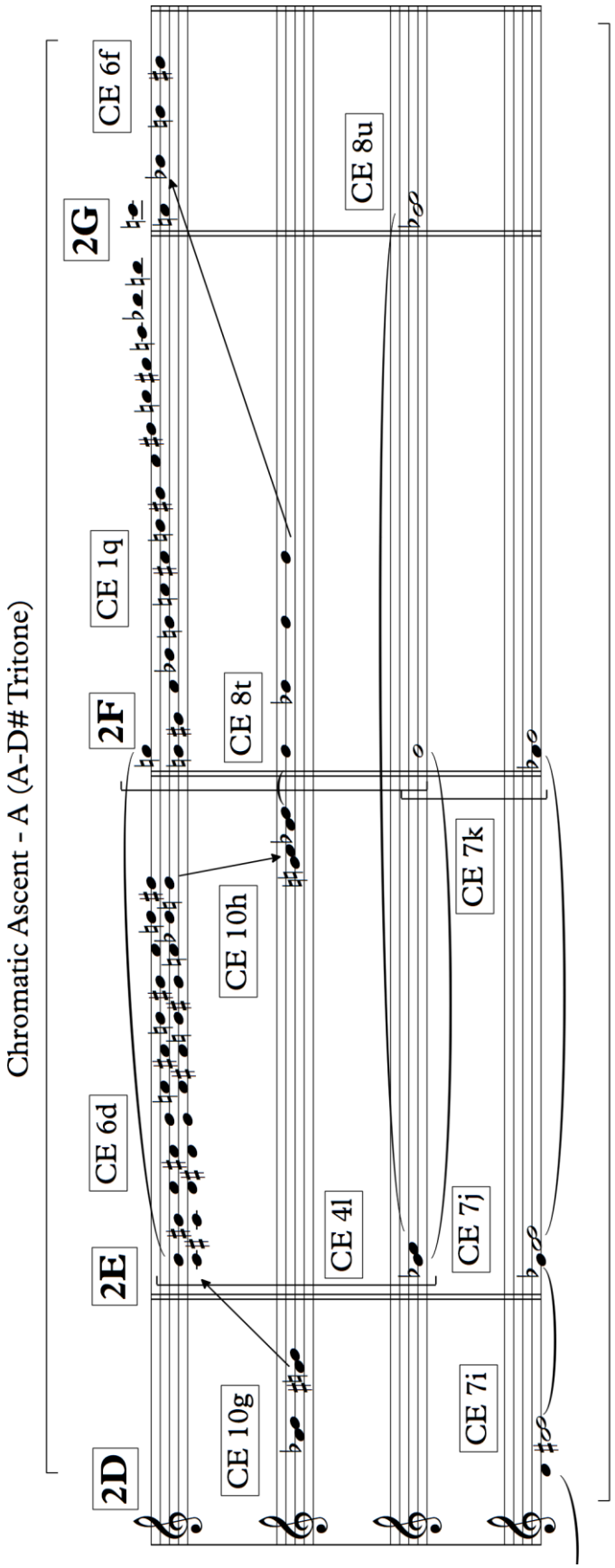


Figure 3.18: Reduction of *segments 2d-2g* of Beat Furrer's *Konzert für Klavier und Orchester*

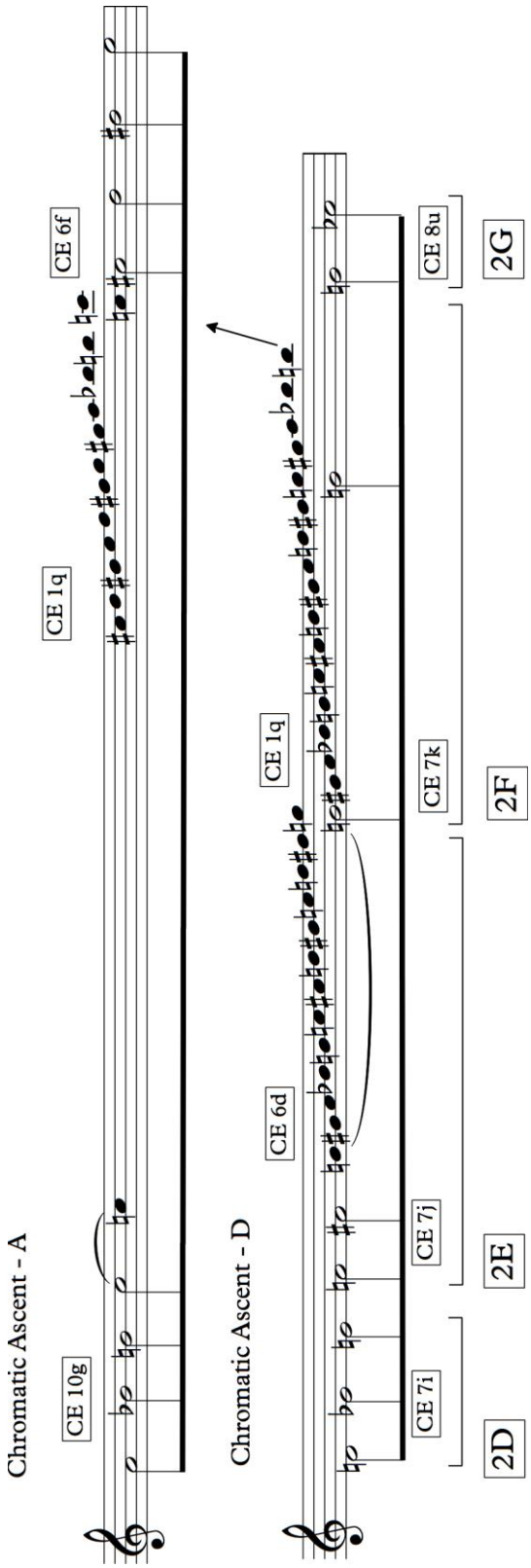


Figure 3.19: Nested chromatic ascent in *segments 2d-2g* of Beat Furrer's *Konzert für Klavier und Orchester*

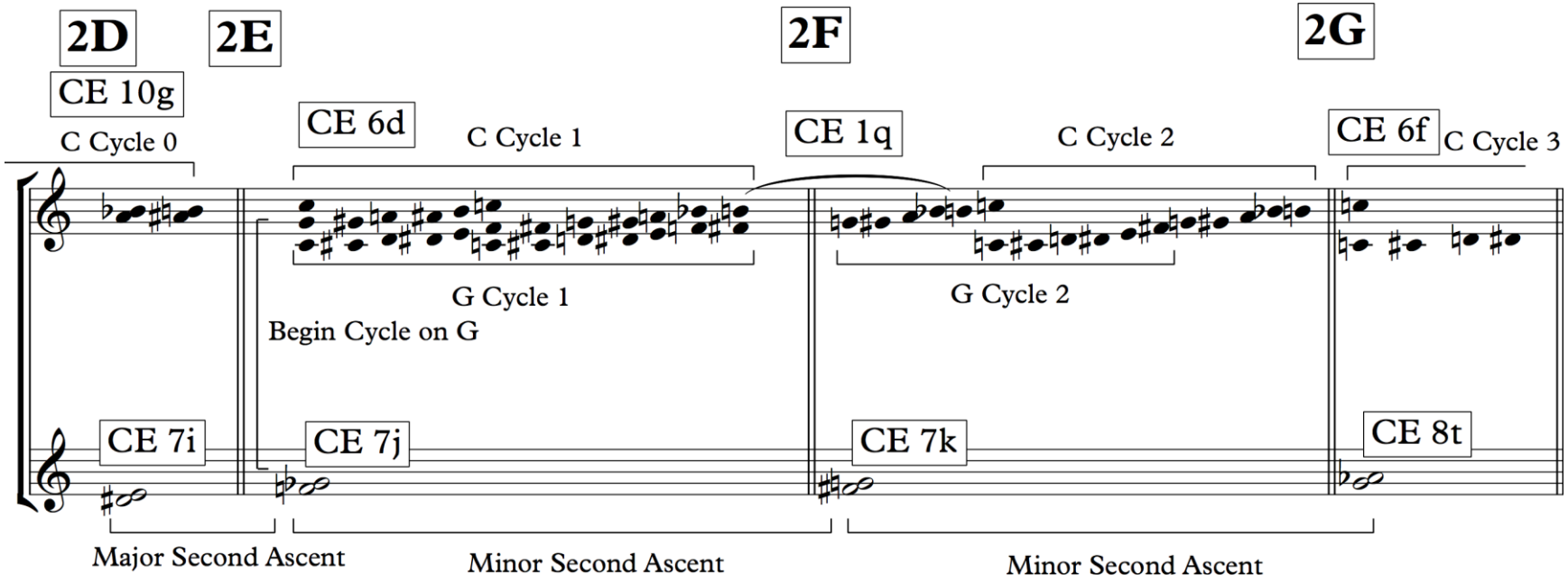


Figure 3.20: Pitch class reduction of *segments 2d – 2g* of Beat Furrer's *Konzert für Klavier und Orchester*

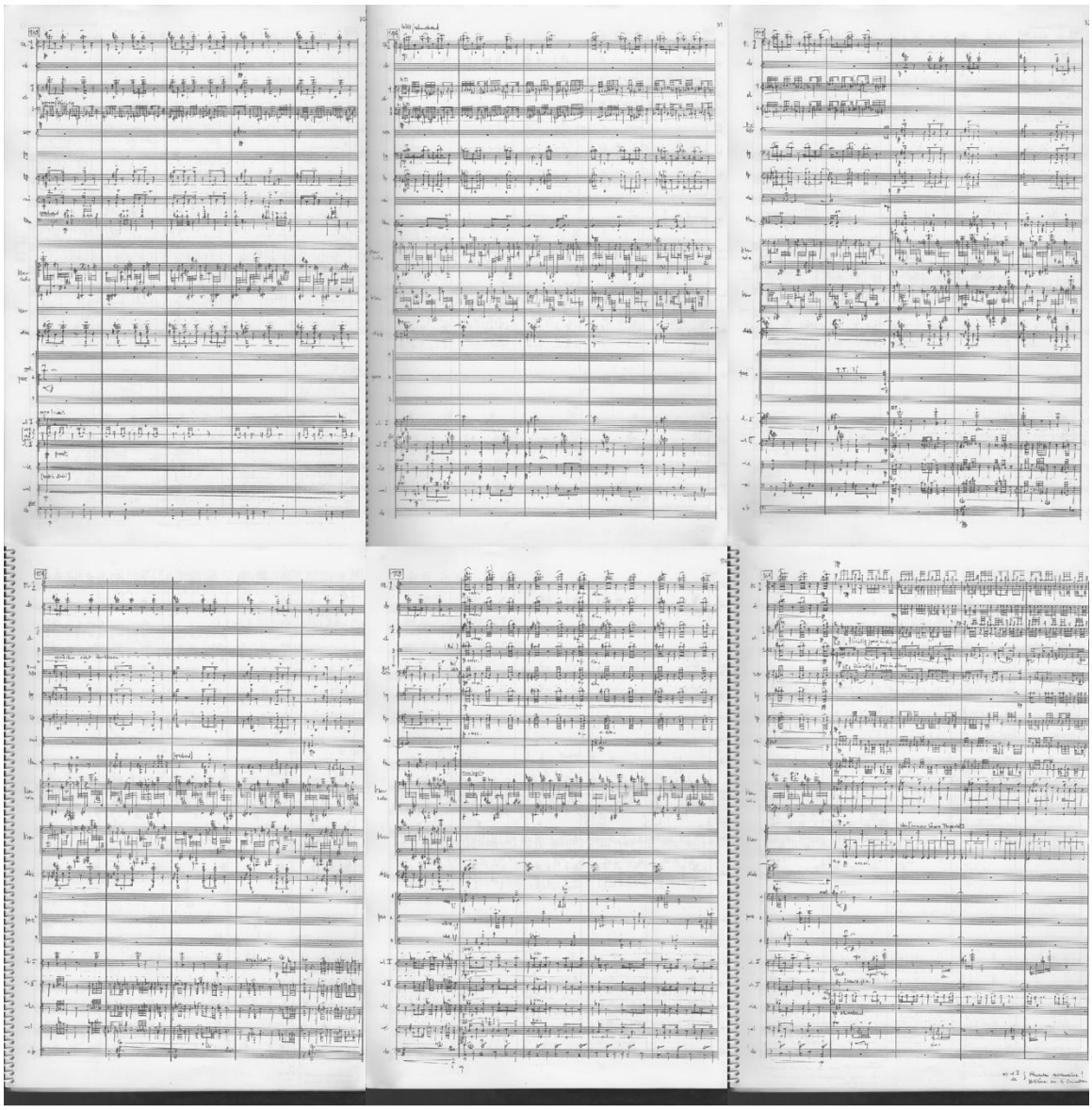


Figure 3.21: Score excerpt of *segments 2d – 2g* from Beat Furrer's *Konzert für Klavier und Orchester*

CHAPTER 4

CHROMATIC SCALE AS PRIMARY MUSICAL MATERIAL II

This chapter focuses on two *chromatic events*: *CE 1s* and *CE 1t*. *CE 1s* and *1t* help define the "response" character of *Section 2 Response* and *Section 3 Response* character as they contain relatively slow-moving sustained music. *CE 1s* is performed by the solo piano in *Section 2 Response* and is comprised of two chromatic ascents moving at different speeds, shown in Figure 4.1. These ascents are part of a mensuration canon truncated by the first voice arrival on C8 in measure 279, excerpted aa Figure 4.2. *CE 1t*, given as Figure 4.3, is the plaintive descent by the ensemble piano in the denouement, *Section 3 Response*. This descent, *CE 1t*, brings the composition to a close. Two other *chromatic events* in the composition are related to *CE 1s* and *CE 1t: CE 4h* and *4t.* Figure 4.4 shows that *CE 4h* and *4t* contain slow, soft, sustained descents, similar to *CE 1t* and *CE 1s*. *CE 1t* is less developed than *CE 1s*, so it will be explored first.

CE 1t

CE 1t, the most obvious chromatic descent in the concerto, occurs in the ensemble piano in *segment 2j* of *Section 3 Response*. Rest substitution, octave displacement, and timbre are used to vary *CE 1t*, which is a continuation of *CE 4t* which begins in *segment 2i*. *CE 4t* interrupts the compositional climax of *segment 2h* with a loud pitch class Bb

followed by a non-chromatic stepwise descent that begins in measure 354. The solo piano provides an agitated pedal structure that accentuates the combined descent of *CE 4t* and *CE 1t* by forcefully hammering out dissonant sonorities in the highest register of the piano using the following pitch class collection: {D D# E F F# G G# A Bb B}. Another pedal, which is the most important ensemble sonority in *segment 2j – 2k,* is the sustained pitch class [C C# B] trichord in the accordion, *CE 9u* and *9w*. In addition to these two pedals and the combined ascent, the rest of the ensemble presents noisy pitch material, noise itself, or other high pitches reminiscent of material from *Section 2 Response*.

CE 1s

The defining *chromatic event* of *Section 2 Response* is *CE 1s. CE 1s* is comprised of a two-voice mensuration canon performed by the solo piano. Each voice ascends up the chromatic scale; however, each voice begins on different pitch classes, begins at different points in time, and moves at different rates of speed. Left on its own, this mensuration canon would result in an infinite loop that repeats every 189 measures, shown in its entirety in Figure 4.5. In this particular concerto, Furrer truncates this infinite loop when the top voice arrives and remains on C8 in measure 279.

CE 1s is accompanied by *CE 8af*, which contains a pitch class F# high pizzicato that recurs every eleven sixteenth notes, varied lightly by rest substitution, and a D pizzicato that recurs every nine sixteenth notes, varied substantially by rest substitution, shown in Figure 4.6. The rhythmic relationship between the pitch class F# and D is 11:9, which results in phasing between the pizzicati themselves as well as the meter of the composition. The timbre of these pizzicati is similar to the C8 arrival on the highest note

of the piano in *CE 1s*. The other event that occurs during *Section 2 Response* is *CE 9o*, a T7 [0123] tetrachord consisting of string harmonics with the performance indication of gläsern — glassy, shown in Figure 4.7.[28] This chromatic tetrachord is scored in open voicing, save for a minor second in the lower two voices. It is scored as harmonics in the very high register of the strings which masks the pitch a bit, giving *CE 1s* a noise-pitch quality. In addition to *CE 8af* and *CE 9o*, other pitches or noises occur throughout *Section 1 Call*, exploring noise-based timbres, yet evince no clear pattern.

Two Analyses of a Mensuration Canon

There are at least two valid ways to analyze *CE 1s*: 1) by analyzing it as traditional canon and 2) viewing the event as discrete pitch and rhythmic cycles. Both analyses produce valid and interesting results, illustrating the high level of ambiguity present in this composition. For this analysis, we will call the top voice Chromatic Ascent 1 and the bottom voice Chromatic Ascent 2.

Looking at *CE 1s* as a traditional canon, the *dux* is comprised of a rising line beginning on pitch class B demonstrated in Figure 4.8, a pitch class reduction of both voices of the canon. The line contains a minor second ascent that occurs every seven sixteenth notes. The *dux* contains four instances of pitch class B-Bb cycles. The first begins in measure 247 on beat one, the second on the third eight note beat of 257, the third on beat one of measure 268, and the fourth occurs on the third eight note beat of measure 278. The fourth instance is incomplete, rising only to C8 and remaining there for the remainder of *Section 2 Response*.

[28] Beat Furrer, *Konzert für Klavier und Orchester* (Kassel, Germany: Bäerenreiter, 2007), 52.

The first note of the *comes*, pitch class C, is not the beginning of the second canon. The pitch class C represents a pick-up entrance; it is the end of an incomplete "instance zero". Therefore, the first instance of the *comes* starts on beat one of measure 250 transposed a major second higher than the first voice, starting on pitch class C# and ending on C in measure 289, shown in Figure 4.8. The second instance of the *comes* occurs on the third eighth beat of measure 263 while the third and final instance begins on beat one of measure 277. This analysis reveals an upper voice and lower voice pitch class convergence from pitch class B to C and C# to C, respectively over the course of the canon, similar to a Phrygian cadence, shown in Figure 4.9.

While this traditional analysis emphasizes long-term double chromatic neighbor motion over the course of *Section 2 Response,* a cycle-based analysis reveals certain other attributes of *CE 1s*. The core principle of the cycle-based analysis involves breaking Chromatic Ascent 1 and Chromatic Ascent 2 into their discrete components: rhythmic cycles and pitch cycles. Since the rhythmic components of the ascents are seven sixteenth notes long and nine sixteenth notes long, respectively, the rhythmic cycles fall in and out of synch with the meter of the composition. Chromatic Ascent 1 has a seven sixteenth note cycle while Chromatic Ascent 2 has a nine sixteenth note cycle. One rhythmic cycle begins on the downbeat of a measure, phases, then returns. Therefore, one complete pass through a rhythmic cycle will return the canon to the downbeat of a measure.

A pitch cycle moves through the entire ordered chromatic collection, returning to its starting pitch. Pitch cycles always contain the entire ordered chromatic collection, but require a starting pitch for analysis. Three possible pitch classes could start the pitch

cycles: B, C, or C#. B is possible since it is the opening pitch class of *CE 1s,* but a B cycle would end on Bb, which is not a prominent pitch in *Section 2 Response.* A C#-based cycle would end with pitch class C, but C# does not play a prominent role in *Section 2 Response*. Starting on pitch class C would end on B, the starting pitch of *Section 2 Response,* and exaggerate the top voice arrival on C8 in measure 279. Therefore, beginning pitch cycles on pitch class C yields more salient results than B or C# cycles.

Figure 4.10 is a graphic representation of the cycle-based analysis of *CE 1s*. The top solid line of the graph represents Chromatic Ascent 1 (CA1), and the bottom dashed line represents Chromatic Ascent 2 (CA2). Since these ascents move at different rates of speed, intervallic widening occurs, displayed by the colors between CA1 and CA2. Pitch and rhythmic cycles are indicated on the graph as well as rhythmic unisons. Rhythmic Cycle 1 (RC1) one in CA1 begins on measure 247 while the Pitch Cycle 1 (PC1) in CA 1 begins on the last sixteenth note of that measure. CA1 completes three pitch class cycles, PC1, PC2, and PC3, ending with an arrival on C8. This arrival would be the beginning of a fourth cycle, PC4, if it continued. The rhythmic cycle of CA1 is the only un-crippled cycle, as it completes seven full cycles over the course of *Section 2 Response*. CA2 begins its first pitch cycle on the final sixteenth note of measure 168. The first rhythmic cycle of CA2 begins on beat one of measure 170. CA2 consists of three complete pitch cycles and six and one-eighth rhythmic cycles.

Cycle-based analysis demonstrates the offset between rhythmic cycles and pitch cycles within each ascent. The first pitch cycle of CA1 starts after a rhythmic cycle. CA2, on the other hand, begins with the pitch cycle followed by the beginning of the

rhythmic cycle. The pitch and rhythmic cycle offset emphasizes pitch class C, which is not clear in the traditional *dux/comes* analysis.

Figure 4.10 also highlights the intervallic expansion and inevitable contraction between the CA1 and CA2. The expansion occurs because of the starting points, pitches, and rhythms of the two voices of the canon while the contraction is a direct result of abridging the canon by confining CA1 on C8 in measure 279.[29] Arrival of the C8 pedal is a climactic moment in *Section 2 Response* which is built up to through a series of smaller climaxes. These climaxes are realized through harmonization, octave displacement, and dynamic changes within each note of each voice of the canon. Additional, the climax at measure 275 is accentuated with an ensemble response, demonstrating that the ensemble and solo piano are working together to realize the climactic arrival in measure 279. The timing, or form, of the smaller climactic arrivals is a direct result of the mathematical construction of the canon. The climaxes occur when the cycles collide, resulting in unison arrivals between CA1 and CA2. Additionally, all the climactic moments, as well as the C8 arrival, reinforce the idea of a pitch class shift from B to C over the course of *Section 2 Response.* The analysis below works backwards from the C8 arrival in measure 279 and examines each climactic moment in *CE 1s* in detail. The examination of these moments will also provide details for why the pitch centricity shifts from B to C in *S2R* and will show that Beat Furrer is emphasizing the mathematical structure of this particular mensuration canon.

[29] Moving this voice to a pedal may simply be an irreverent nod to the physicality of the piano, it may just have run out of keys.

Climactic Moments in *CE 1s*

Arrival on C8

The final climactic moment in *CE 1s* occurs after the CA1's arrival on C8 in measure 279. This climax is realized by CA2 forcefully contracting up into the pedal, shown in Figure 4.11. Before CA1's pedal arrival, purely from the perspective of pitch class, CA2 had been moving convergently back towards the upper voice. This convergent motion is best demonstrated by extracting the unison dyads of both ascents over the course of the canon, shown in Figure 4.12. Figure 4.12 also illustrates that after CA1's arrival, CA2 turns away from CA1, from the view of interval class, and becomes divergent. The switch from convergence to divergence occurs on a pitch class [Eb E] dyad, emphasized with dissonance, shown in Figure 4.11. This dissonance continues, as The final five pitches of the arrival of CA2 into the CA1 are harmonized with minor seconds, also highlighted in Figure 4.11. This use of dissonance is reminiscent of when the pitch class [F F#] dyad is used to amplify the convergence of the ascent into the {F F# G} pedal in *CE 1q*. The pacing of *CE 1s* is slower than *CE 1q*, so the additional time allows for stronger emphasis of this convergent moment, but the function of the dissonance is the same.

Instead of resolving up to C8 on time, due to a rhythmic unison that will inevitably occur in measure 261, CA2 delays arriving into CA1 by staying on pitch class B, shown in Figure 4.11. If CA2 had converged on the pedal when scheduled, the independence of the lower voice would be lost; it would seem like the upper voice absorbed it. Finally, once CA2 does contract into the pedal of CA1, it only remains there momentarily. CA2 starts a false, unrealized descent, nudging back down to B for its final

two notes as CA1 completes its seventh rhythmic cycle.

In addition to the arrival itself, this passage demonstrates that pitch class C and G# enjoy a privileged relationship during *CE 1s*. So far, in this composition, pitch class G# relates to C in two ways: 1) it is the fifth partial off the fundamental E, which has already been seen to enjoy a privileged relationship with C over B in *S1R*, and 2) G# is one of the symmetrical thirds able to divide the chromatic scale into tetrachords. During this climactic arrival, the ensemble piano plays a pitch class G#6 harmonic on the fifth sixteenth note of measure 292 which occurs right before the CA2 converges into CA1. Therefore, the relationship between pitch class G# and C is emphasized, as it is throughout *CE 1s,* in order accentuate the shift from B to C throughout the passage.

To further illustrate that pitch classes G# and C have a relationship during *CE 1s*, Figure 4.13 contains all sonorities that occur in *CE 1s*, grouped by pitch class. In this figure, grouped sonorities retain their sounding pitch, harmonization, important articulation, and important dynamics. Looking at pitch class 8, G#, Figure 4.13 clearly shows that instances of pitch class G# are emphasized through octave doubling in both voices. Pitch class G# also occurs during a pivotal rhythmic unison climax in between the two ascents on the last sixteenth of measure 275. The other pitch class involved in this unison is C, which strengthens the case for a unique relationship with G#.

B-Supportive and C-Supportive Networks

There are other important relationships between pitch classes in *CE 1s*. Returning to Boatwright's assertions from Chapter 3, three other pitch classes can emphasize pitch class C: G, E, and D. These pitch classes also occur in the smaller climaxes and enjoy a

degree of variation by harmonization or dynamic change throughout *CE 1s*, which will be demonstrated below. Using the same logic as above, a network can be created that reinforces pitch class B: D#, F#, G, and C#. The only pitch class shared between the C-supportive and B-supportive pitches is G, a symmetrical third of B and supporting fifth of C, shown in Figure 4.14. In an environment where pitch class C is present, G will favor C in most cases.

These two pitch class networks reinforce the concept of pitch class shift throughout *CE 1s*. For instance, the pitch class E and Eb dyad in CA2 in measure 280 functions more than a simple indicator showing convergent to divergent interval class change, it represents C overtaking the final strong pitch class attachment to pitch class B in the passage. The pitch class Eb would normally reinforce B, but its relationship with B is weakened by the strength of the relationship between E and C, as CA 1 has arrived on the C8 pedal. Since this final arrival represents the end of the shift from pitch class B to pitch class C, by working backwards through the other climactic arrivals, the moments of rhythmic unison, we can see how the B-supportive and C-supportive networks evolve over time. The remaining climactic moments in *S2R* occur at rhythmic unisons between CA1 and CA2. These unisons are shown in Figure 4.15. Notice the intervallic expansion then contraction between the upper voice and lower voice.

RU 4, RU 3, RU 2, RU 1

The rhythmic unison that immediately precedes CA1's arrival on C8 is marked as Rhythmic Unison 4 (RU4) on Figure 4.10, shown in Figure 4.16, and occurs in measure

275.[30] RU 4 results in a pitch class [C Ab] climax, mentioned above, lending credence to the idea that G# (Ab) is accentuating the symmetrical thirds of a chromatic ascent beginning on C.

RU3, shown in Figure 4.17, occurs on the downbeat of measure 267, perhaps getting more emphasis from a performer, and represents a forceful departure from pitch class B to C. Pitch class F in this [F B] dyad completely destabilizes any sense of B. Immediately following RU3 is a pitch class [C G] dyad reinforcing C, albeit followed by F#, reinforcing B; however, the wider scoring, low register of C, and addition of G mitigate the destabilizing effect of F# on B. That said, pitch class B still attempts to maintain a presence with the tripled octave C# in measure 269. However, C#7 gives way to the D7 in the next measure, acting like a quasi-leading tone. The D7 arrival is followed by an E7 two measures later. Both D and E are pitch classes that reinforce C. The other tone around RU3 that could possibly emphasize pitch class B would be the D# (Eb) in measure 271. Loud Ab octaves occur one sixteenth note preceding Eb, relegating it to a resonant fifth of Ab rather than a chordal third of B. Additionally, the pitch class Eb is harmonized with Bb, another extremely destabilizing tone for B. The pitch class [Bb D] dyad in measure 267 is post-referential to RU2.

RU2, a pitch class [Bb D] dyad and its surrounding music, shown in Figure 4.18, paints a more ambiguous picture in regards to B- or C-centricity. Pitch class D weakly reinforces C, while Bb has no relationship to B or C. The grace note voice in this unison contains two pitches, pitch class {A Bb}, while the other rhythmic unisons only contain one. Including pitch class A in this grace note puts in motion a secondary chromatic

[30] None of the rhythmic unisons are actually written as unisons, they always favor one voice over the other, relegating one to grace notes status.

ascent, demonstrated in Figure 4.19. Chromatic ascents or descents mean ambiguity, so the secondary ascent makes it difficult for pitch class D# or F# to strengthen B or for E or G to strengthen C. The pitch class D# is harmonized with Bb, which just received validation from RU 2. The pitch class F# is harmonized with C#, which can strengthen B, but in this case works as a quasi-leading tone function to G. Pitch class G is harmonized by D, thus reinforcing G. Pitch class E, which could also strengthen C, is harmonized by B. The pitch class B, C, E paradigm in the music surrounding RU2 is post-referential to what we will see to be an important moment in *Section 1* regarding centricity.

The opening of *CE 1s* up through RU1 demonstrates the high degree of ambiguity in terms of pitch centricity contained in *CE 1s*. The opening of *CE 1s* up through RU1 is shown in Figure 4.20. CA1 does in fact begin with pitch class B, but is immediately challenged by a [C G] dyad. Since this dyad in the same register of the B, lines are instantly blurred in terms of pitch centricity. The following tripled octave pitch class D in measure 249 is the first heavily emphasized sonority in *CE 1s*. Any accented sonority is important, therefore, pitch class D can be viewed as pre-referential to the [Bb D] dyad in RU2. The first potential pitch class B reinforcement would be the Eb in measure 250. Unfortunately for pitch class B, the Eb harmonization with Bb pulls it away from B. The next dyad, pitch class [C E], is pre-referential to the [C E] dyad in measure 280 and further strengthens C. As mentioned before, this [C E] in measure 280 dyad signals the inevitable convergence of CA2 up to CA1.

Pitch classes C, D, E, G, and G#, the C-supportive network, are all emphasized in measures 247 – 256. The pitch class [C E] dyad, when combined with the accented G in

measure 254 and the first [C G] dyad of CA2 in measure 247, results in an eight measure arpeggiation of a C major triad. This arpeggiation strengthens the sense of C-centricity in *CE 1s*. Also, the quadrupled octave G# in measure 254 is pre-referential to RU4 and initiates the relationship between C and G#(Ab). Finally, pitch class D is harmonized with an F# in measure 255.

In terms of centricity, pitch class B has the advantage of being the first pitch class played in *CE 1s*, but does not have as strong a supportive network over the course of measures 247 – 256. The first pitch of *CE 1s* that could reinforce pitch class B is the D# in measure 250. D#, however, actually destabilizes pitch class B, as D#(Eb) is harmonized with Bb. The next pitch class D#, the grace note of CA2 in RU1 in measure 252, also destabilizes B. This D# (Eb) is in unison with a pitch class F, which results in a major second. Highlighting pitch class F in RU1 is also pre-referential to the tritone in RU3, shown in Figure 4.20. Pitch class B would garner its strongest support F# in measure 253, but the scoring results in F# functioning like a leading tone to G rather than reinforcement as a chordal fifth of B, shown in Figure 4.20. F# has one more chance to reinforce B in measure 255, but F# is paired with D, potentially strengthening D over B.

Summary

The above analysis of *CE 1s* corroborates the previous assertion that Beat Furrer is musically exploring properties inherent to the chromatic scale. For instance, the mensuration canon, varied with harmonization and octave displacement, transforms the ascending chromatic scale from a collection of pitches capable of projecting only one interval at a time, into a two-voice contrapuntal exploration of intervallic expansion. *CE*

1s includes vertical instances of every interval class. Overcoming the half step limitation of the chromatic scale is not a result of serendipity, it is result of composition. The decisions Furrer made where to start the canon, how to structure it, how to vary it, which slice to present, and how to cripple the process result in a very musical projection of mathematical process.

The most important compositional decision Furrer made was how to structure the canon. For instance, had he decided to start both voices on the same pitch, there would have been a number of compositional problems: initial unisons, struggle for independence, and obvious projection of the canon. Had Furrer decided to start the second voice of the canon at the fifth, the intervallic expansion would not have been initially emphasized by minor and major seconds. Instead, he chose a specific offset for CA1 and CA2 that results in the following: 1) independence of CA1 and CA2, 2) intervallic expansion emphasized by dissonance, and 3) important arrivals through rhythmic unison. Once the structure of the canon was in place, Furrer was able to use octave displacement, dynamics, harmonizations, and orchestration to amplify the unison arrivals resulting from the construction of the canon. These emphasized arrivals in turn became climaxes that help propel CA1 to its C8 pedal. The pedal results in CA2 turning back on itself, resulting in a rich journey that in terms of pitch class has not actually travelled anywhere, shown in Figure 4.21. Therefore, Furrer has created a teleological music consisting of pitch class loops, which fulfill Douglas Hofsteadter's idea of a *strange loop:* "That is, despite one's sense of departing ever further from one's origin, one winds up, to one's shock, exactly where one had started out."

CE 1s

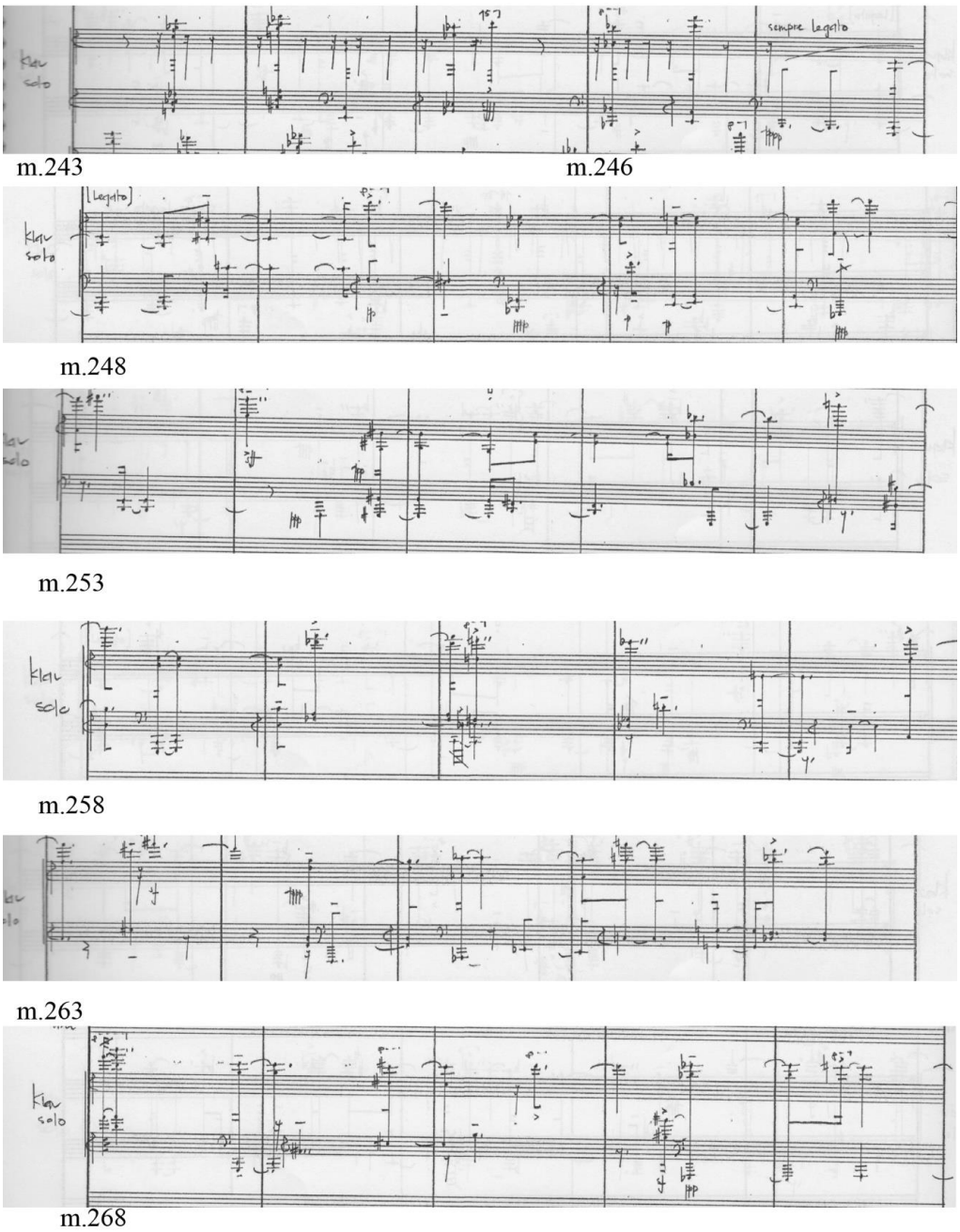
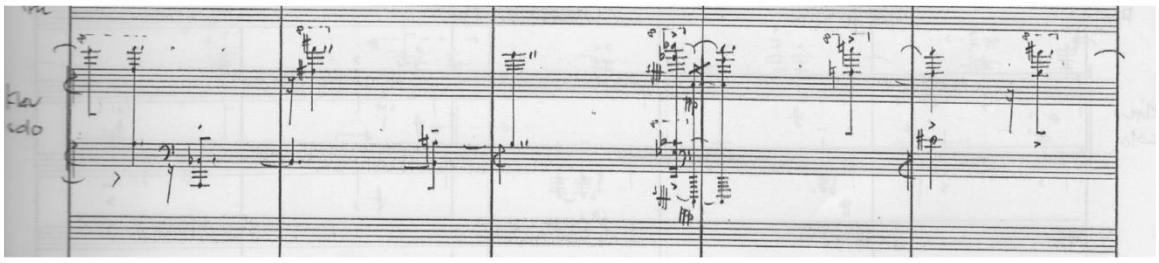


Figure 4.1: CE 1s from *Section* 2 Response in Beat Furrer's *Konzert für Klavier und Orchester*



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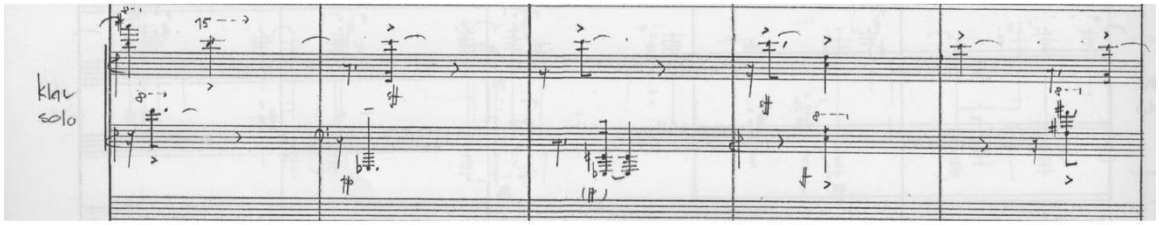

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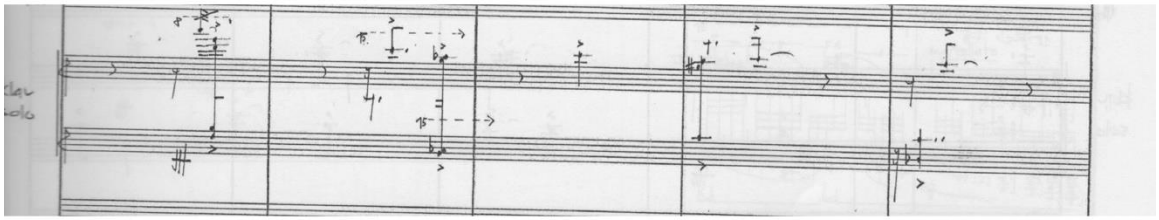

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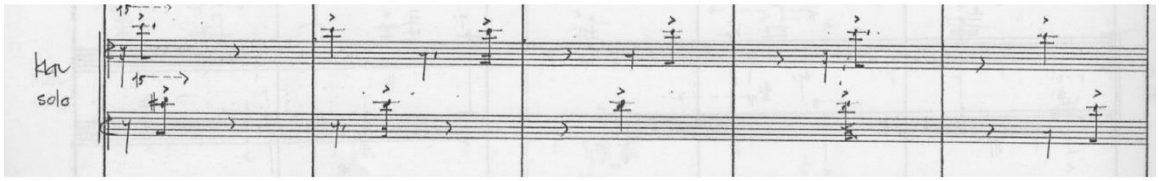

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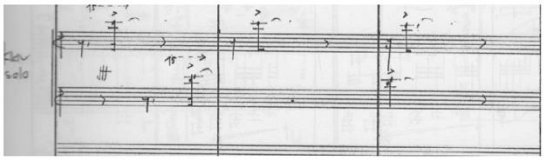

m.293

Figure 4.1 (Continued)

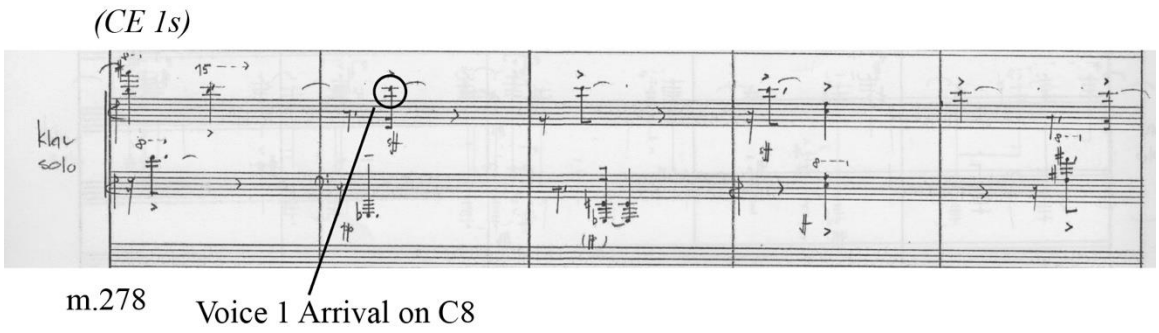

Figure 4.2: *CE 1s* top voice arrival in m. 279 of Beat Furrer's *Konzer für Klavier und Orchester*

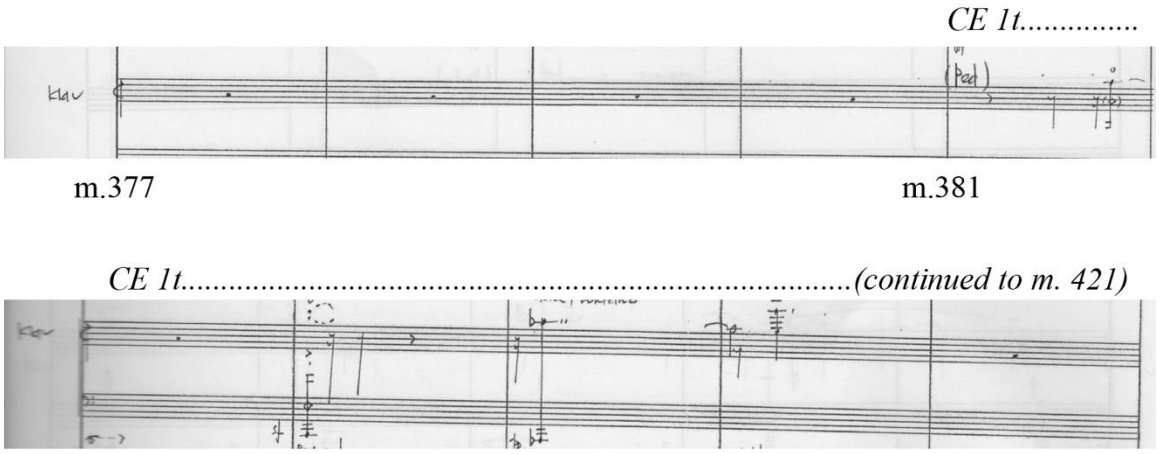

Figure 4.3: *CE 1t* in *Section 3 Response* of Beat Furrer's *Konzert für Klavier und Orchester*

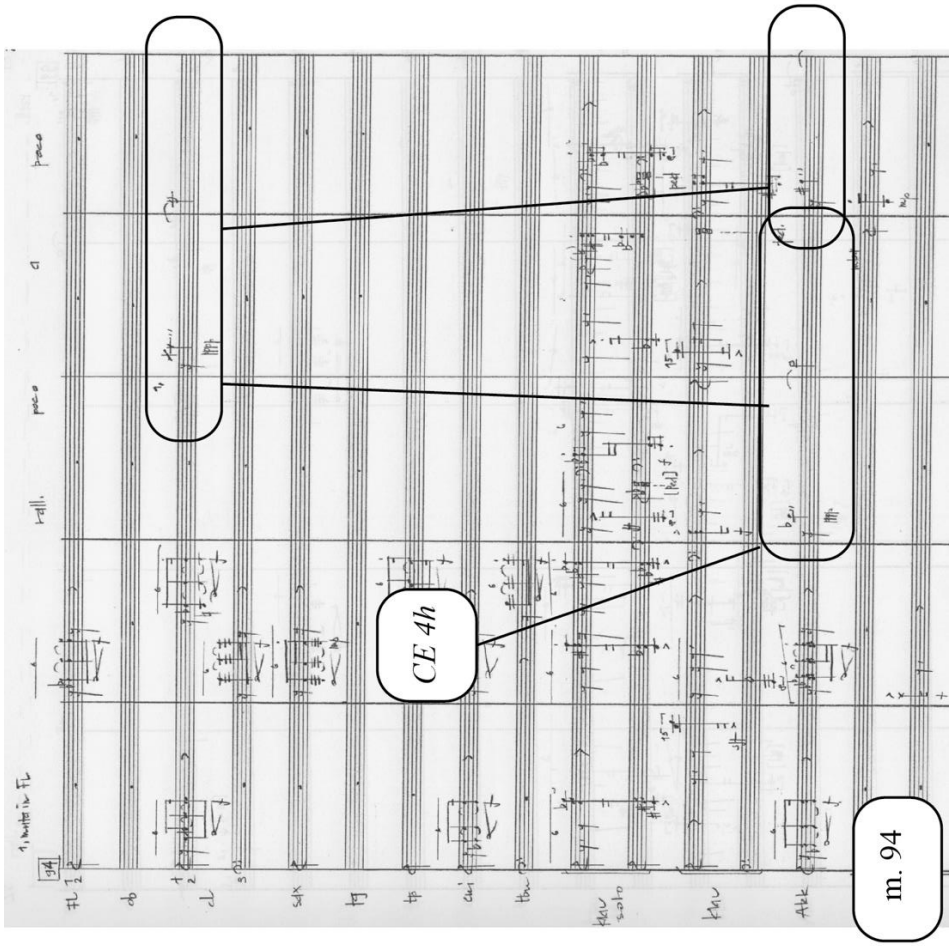

Figure 4.4: Opening measures of *CE 4h* and *CE 4t* from Beat Furrer's *Konzert für Klavier und Orchester*

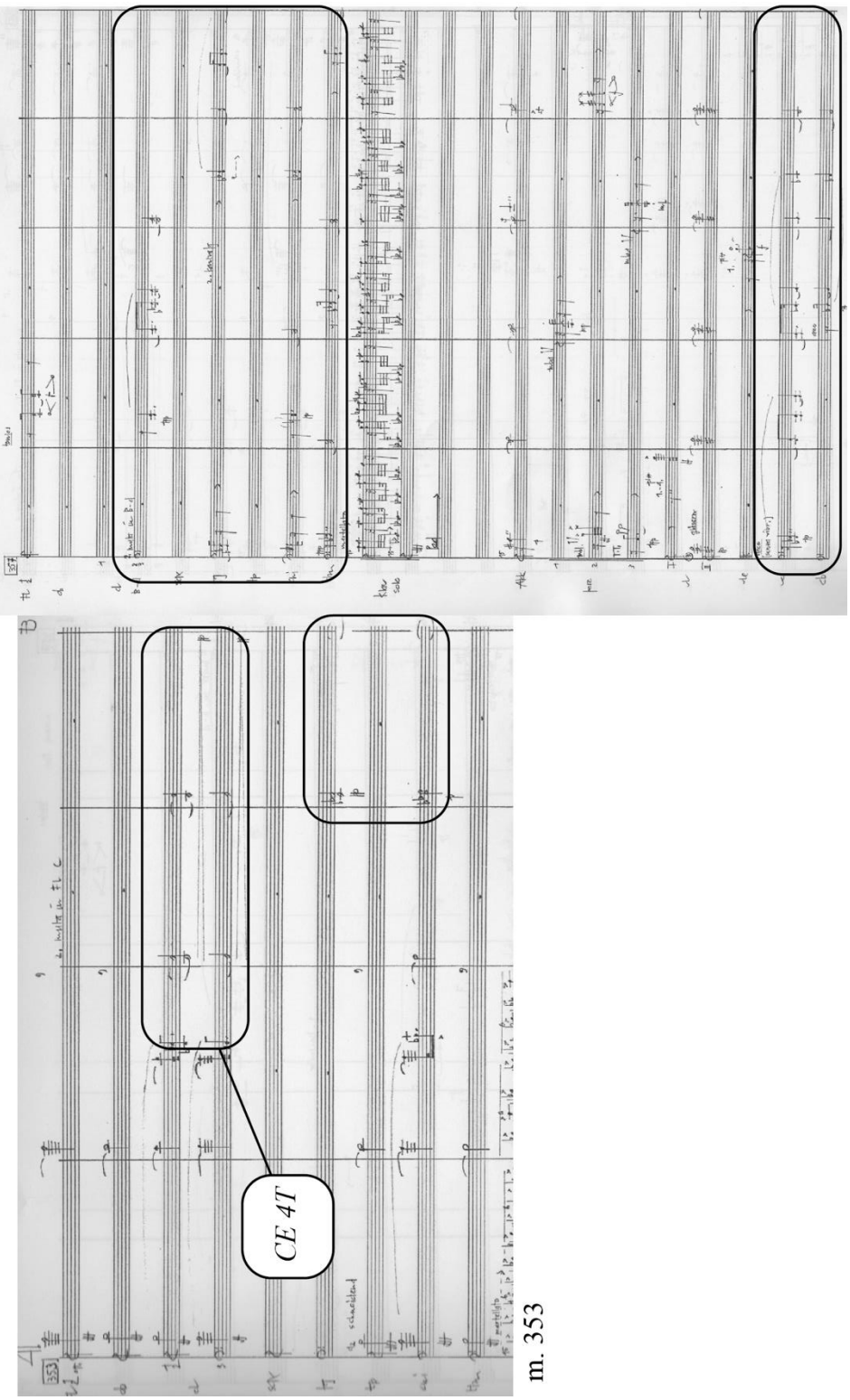

Figure 4.4 (continued)

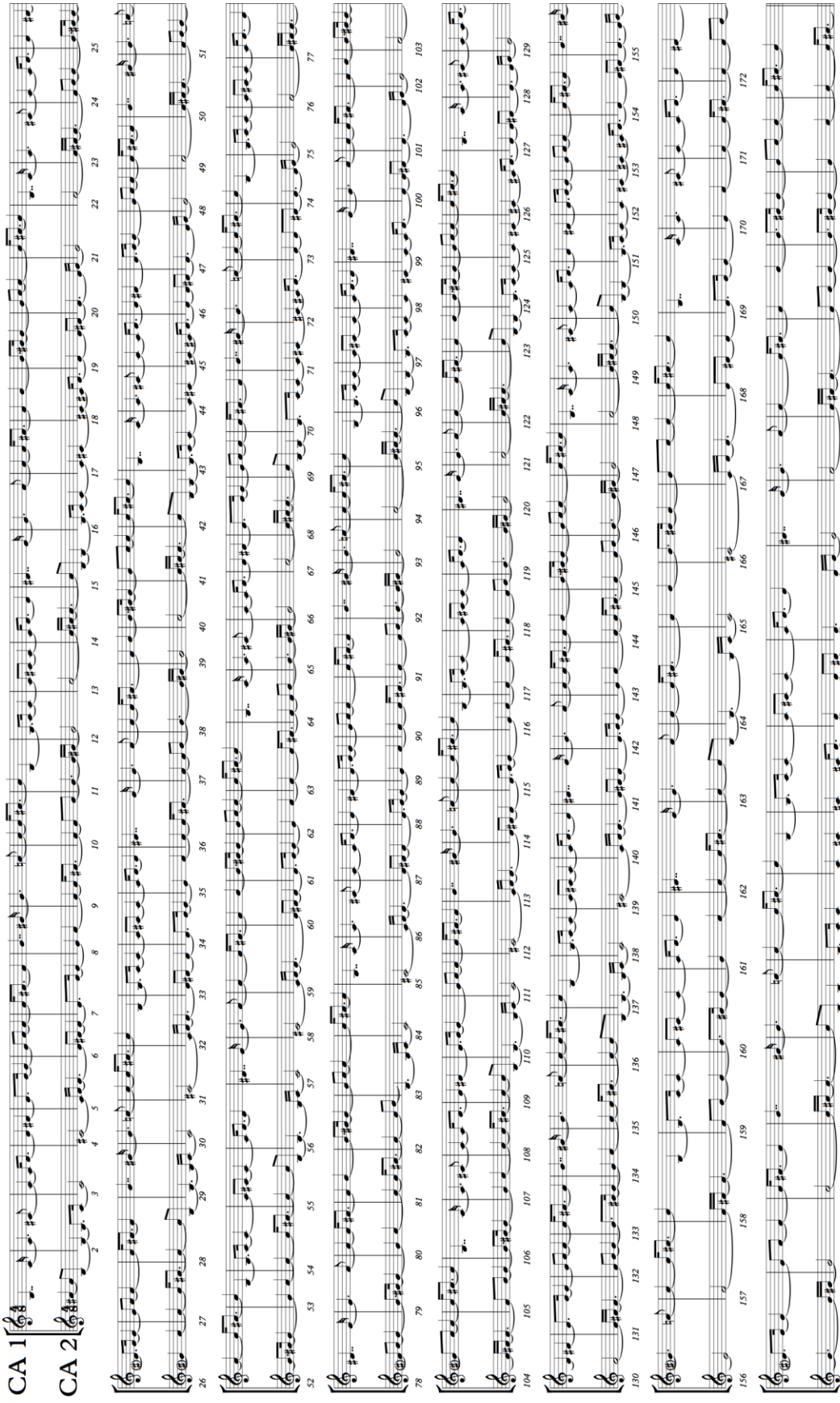

Figure 4.5: Uninterrupted mensuration canon in *Section 2 Response* of Beat Furrer's *Konzert für Klavier und Orchester*

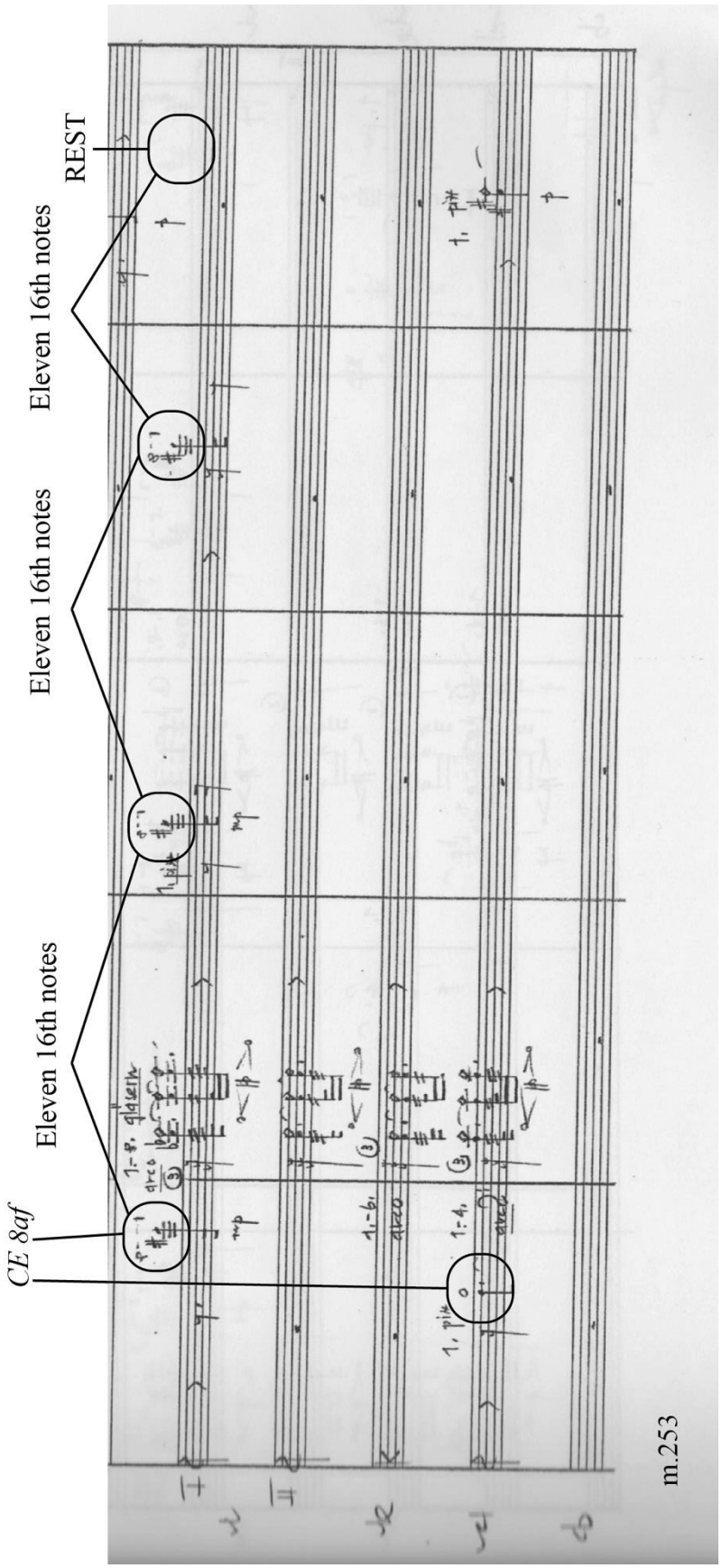

Figure 4.6: *CE 8af* in *Section 2 Response* of Beat Furrer's *Konzert für Klavier und Orchester*

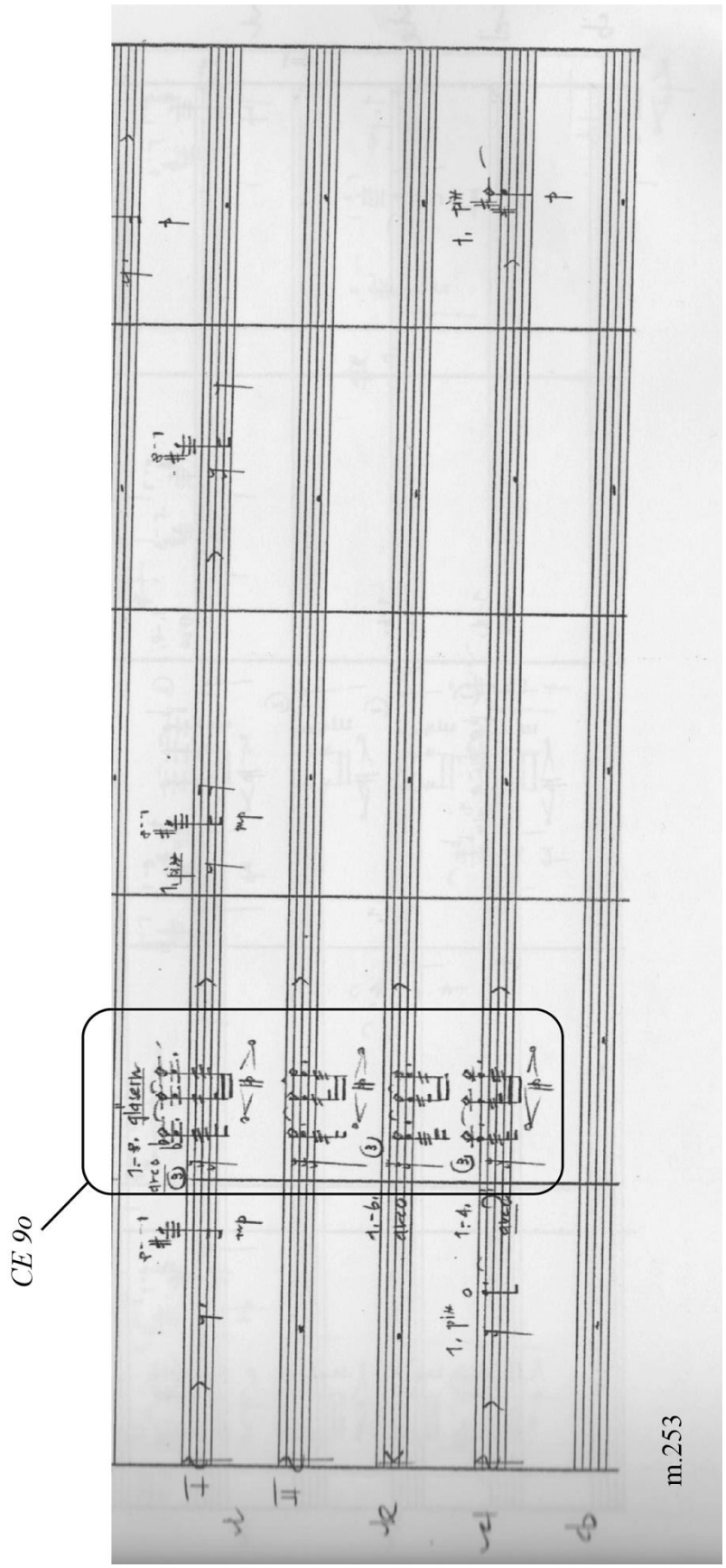

Figure 4.7: *CE 9o* in *Section 2 Response* of Beat Furrer's *Konzert für Klavier und Orchester*

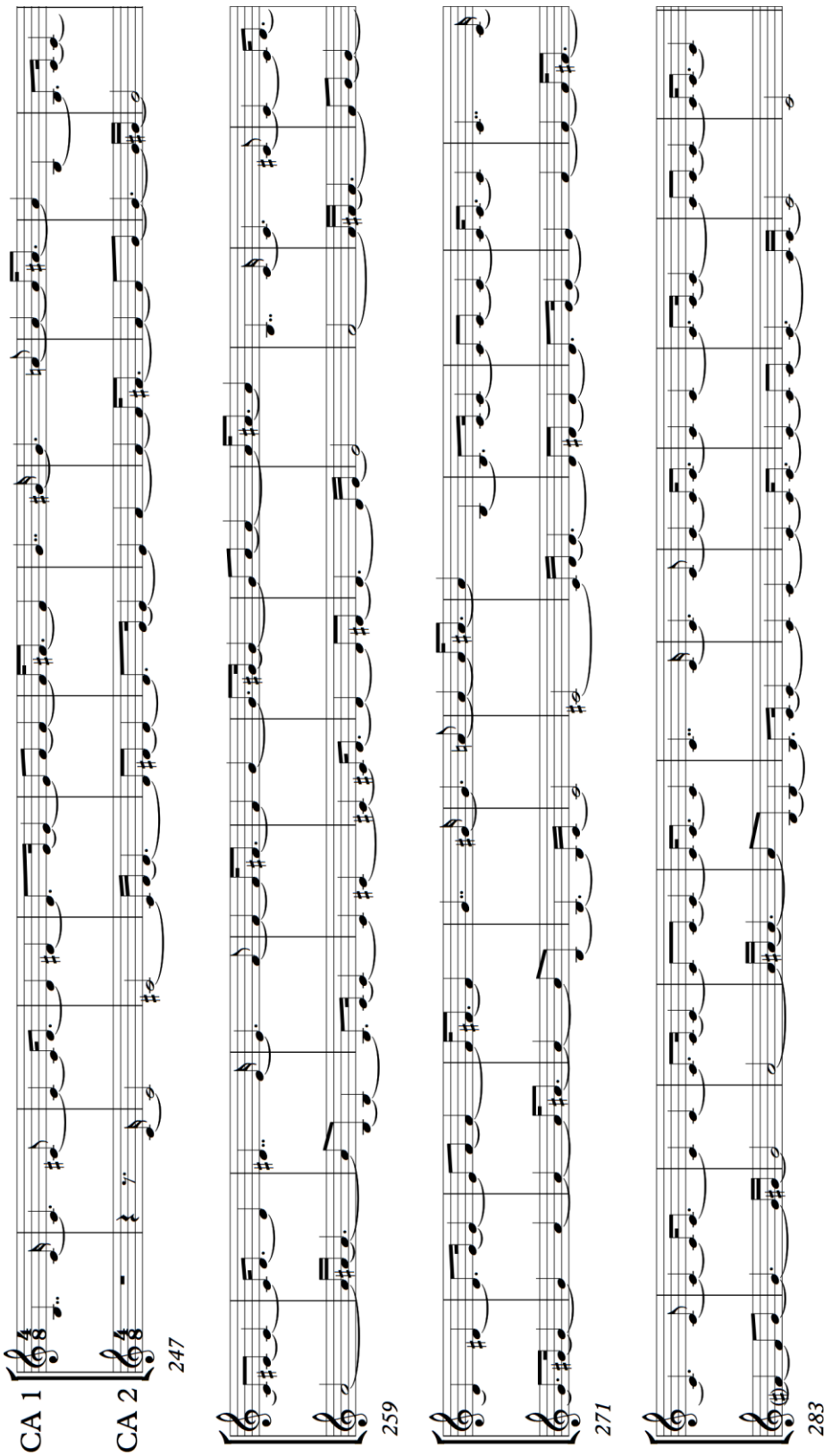

Figure 4.8: Reduction of *CE 1s* in *Section 2 Response* of Beat Furrer's *Konzert für Klavier und Orchester*

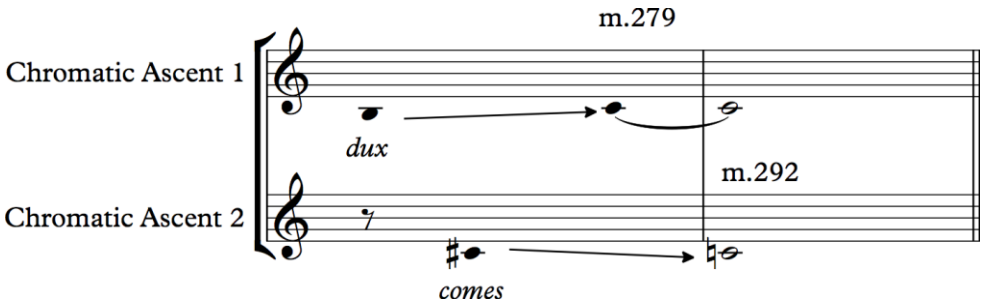

Figure 4.9: Reduction of *CE 1s* demonstrating upper and lower neighbor motion to C from Beat Furrer's *Konzert für Klavier und Orchester*

Figure 4.10: Graphic representation of *CE 1s* in *Section 2 Response* of Beat *Furrer's Konzert für Klavier und Orchester*

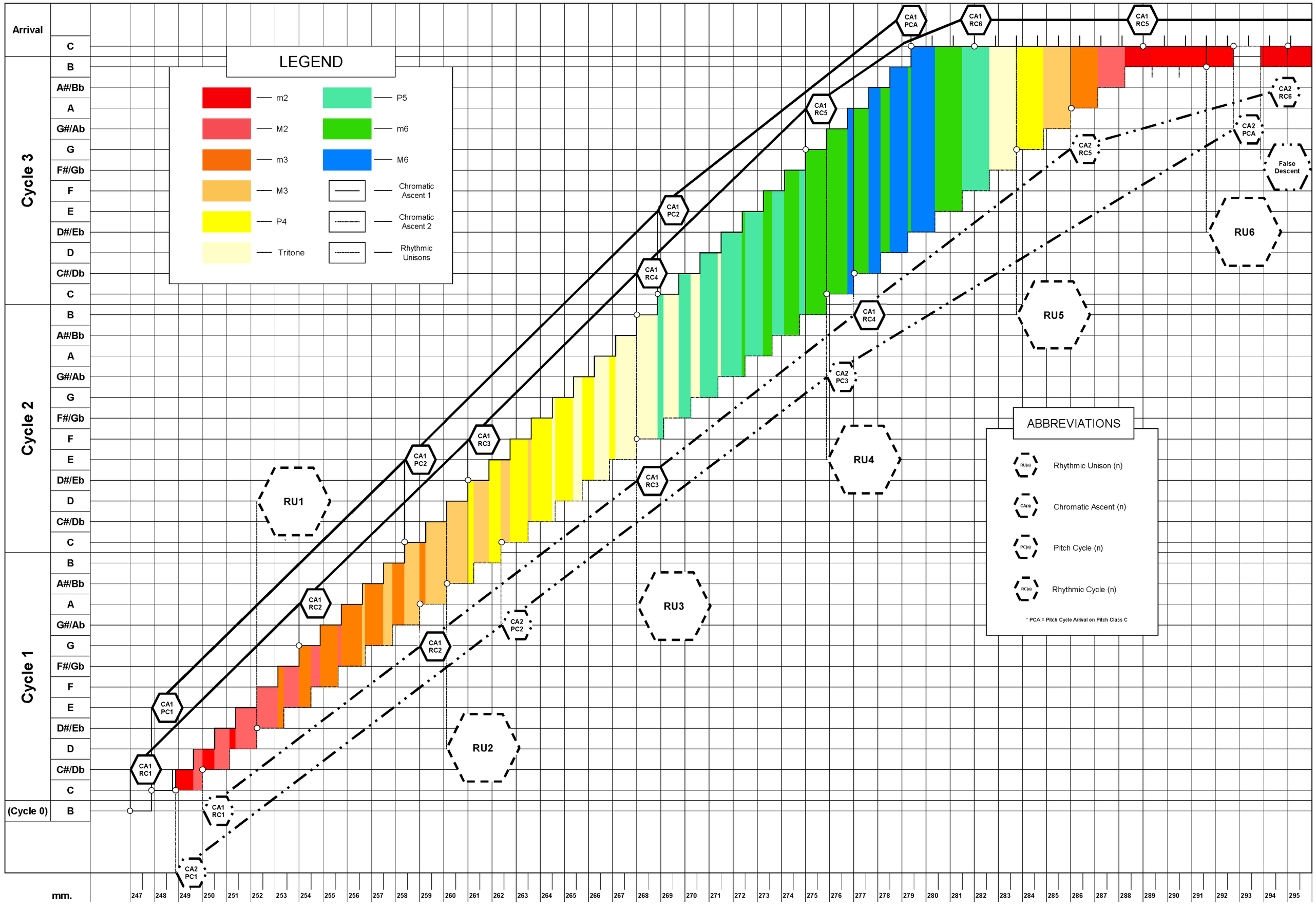

Figure 4.10: Graphic representation of *CE 1s* in *Section 2 Response* of Beat Furrer's *Konzert für Klavier und Orchester*

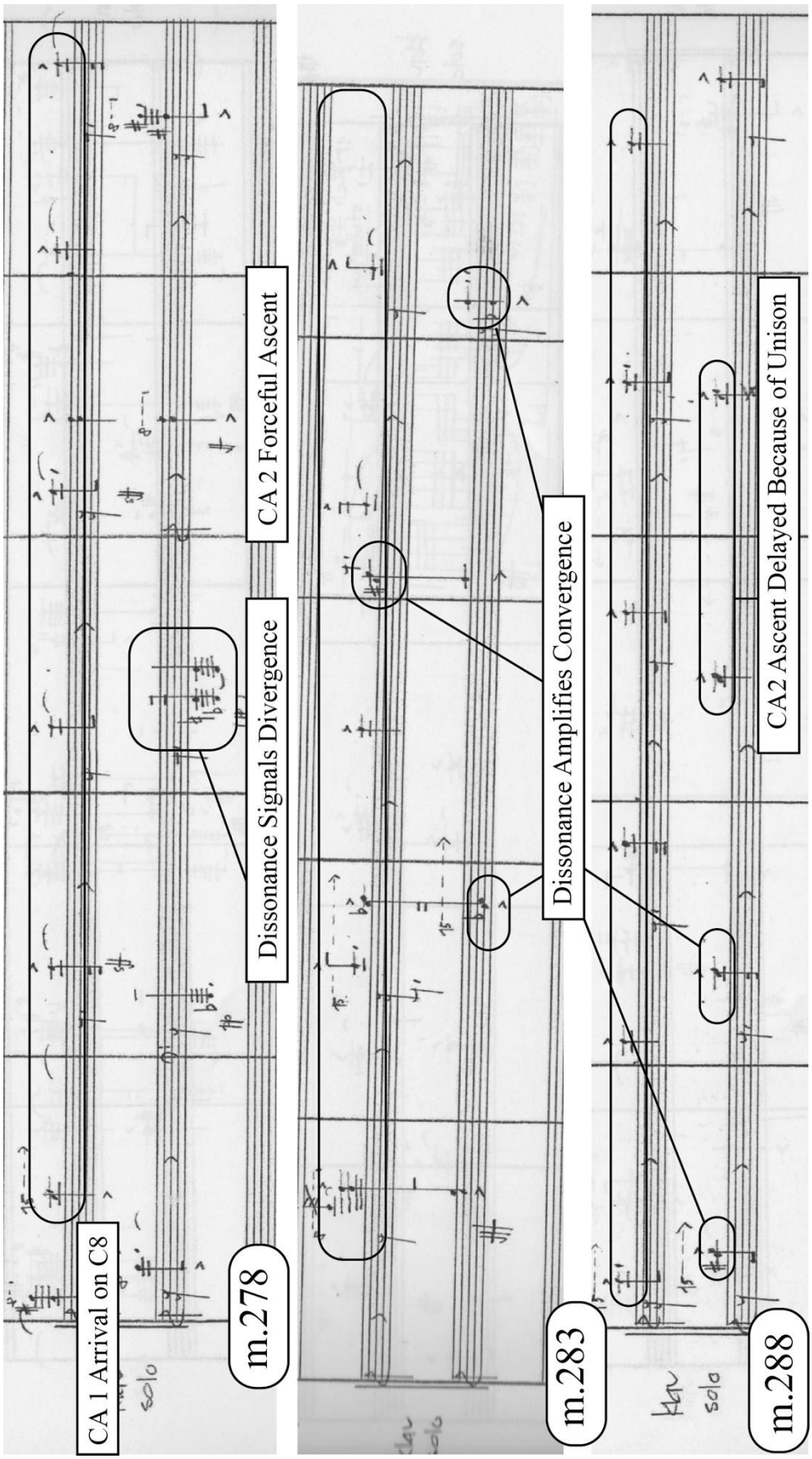

Figure 4.11: Chromatic Ascent 1 arrival and Chromatic Ascent 2 convergence at the end of *Section 1 Response* in Beat Furrer's *Konzert für Klavier und Orchester*

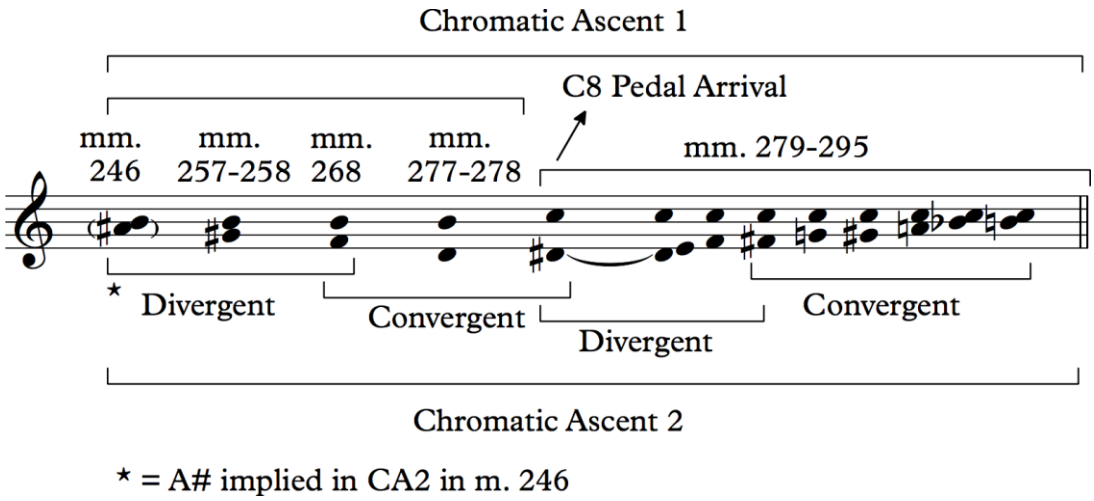

Figure 4.12: Arrival points of Chromatic Ascent 1 and Chromatic Ascent 2 in *Section 2 Response* of Beat Furrer's *Konzert für Klavier und Orchester*

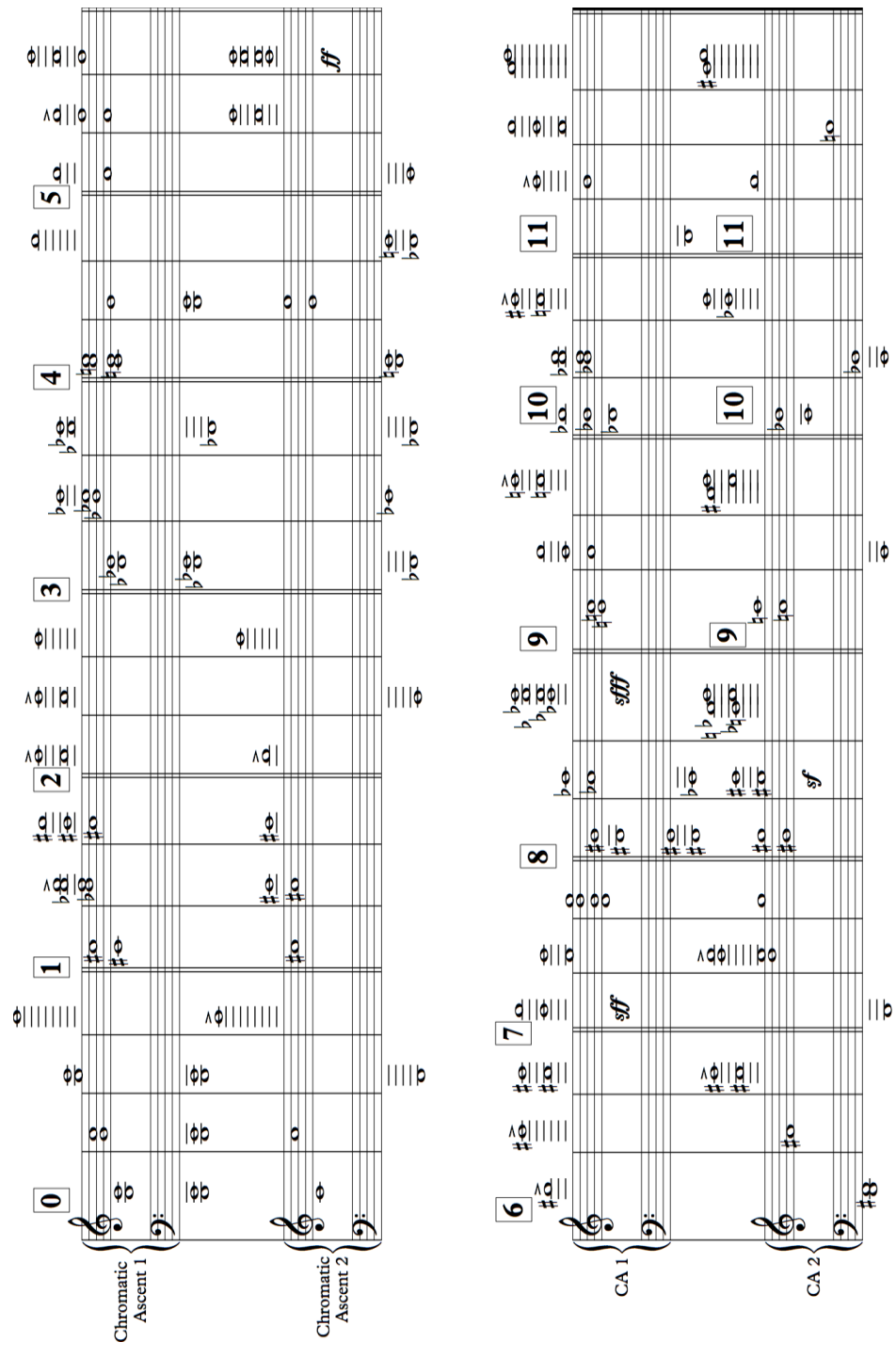

Figure 4.13: Harmonization, octave displacement, and important dynamics in *CE 1s* of Beat Furrer's *Konzert für Klavier und Orchester* grouped by pitch class

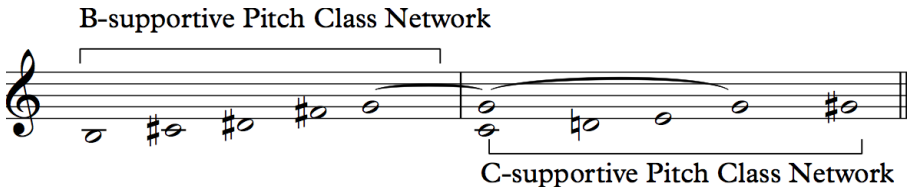

Figure 4.14: B-supportive and C-supportive pitch class networks

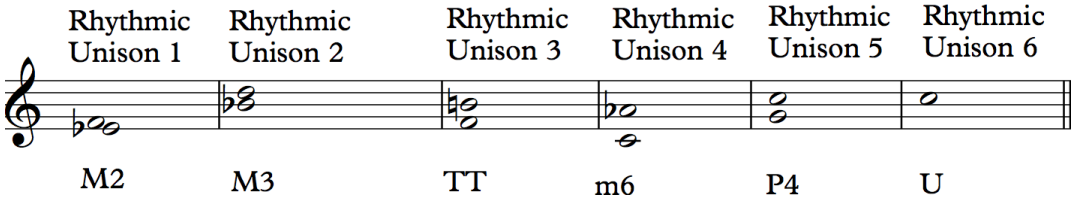

Figure 4.15: Intervals that occur in rhythmic unisons in *CE 1s* in *Section 2 Response* of Beat Furrer's *Konzert für Klavier und Orchester*

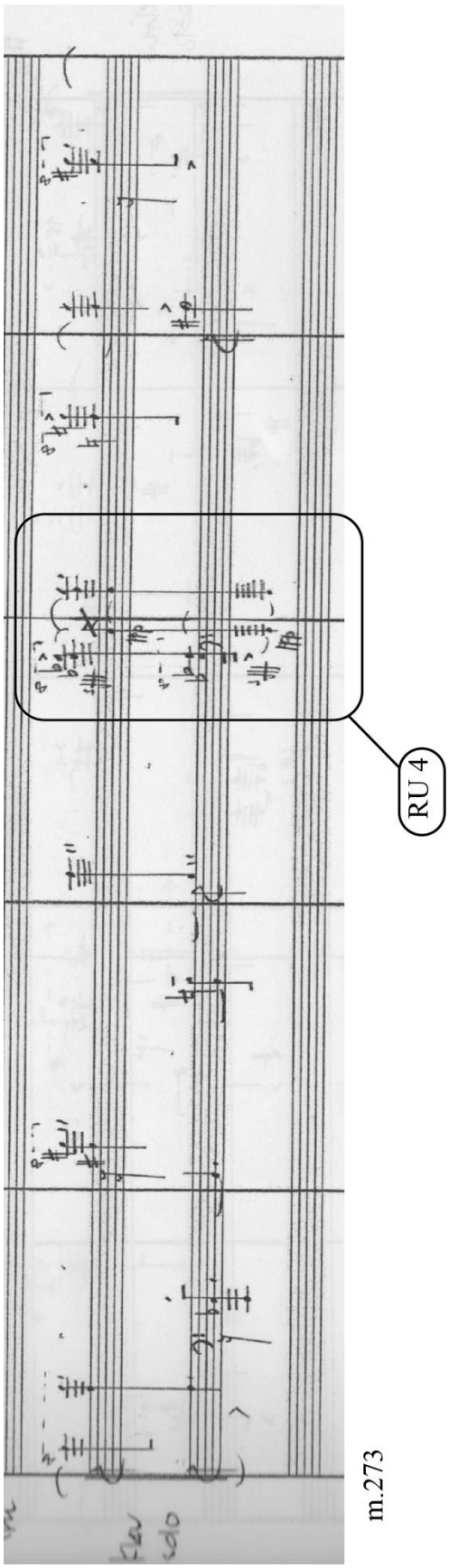

Figure 4.16: RU4 in *Section 2 Response* of Beat Furrer's *Konzert für Klavier und Orchester*

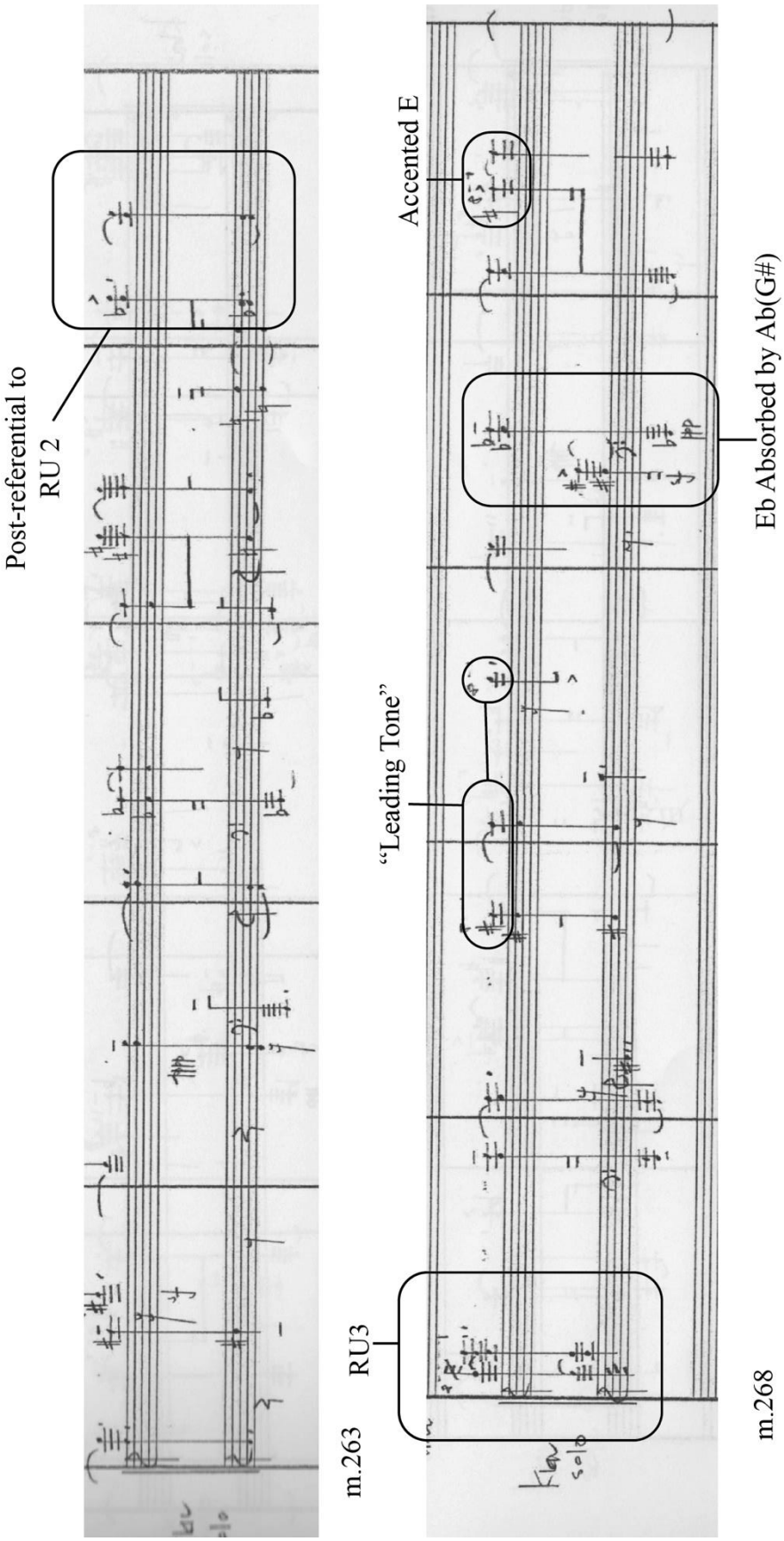

Figure 4.17: RU3 in *Section 2 Response* of Beat Furrer's *Konzert für Klavier und Orchester*

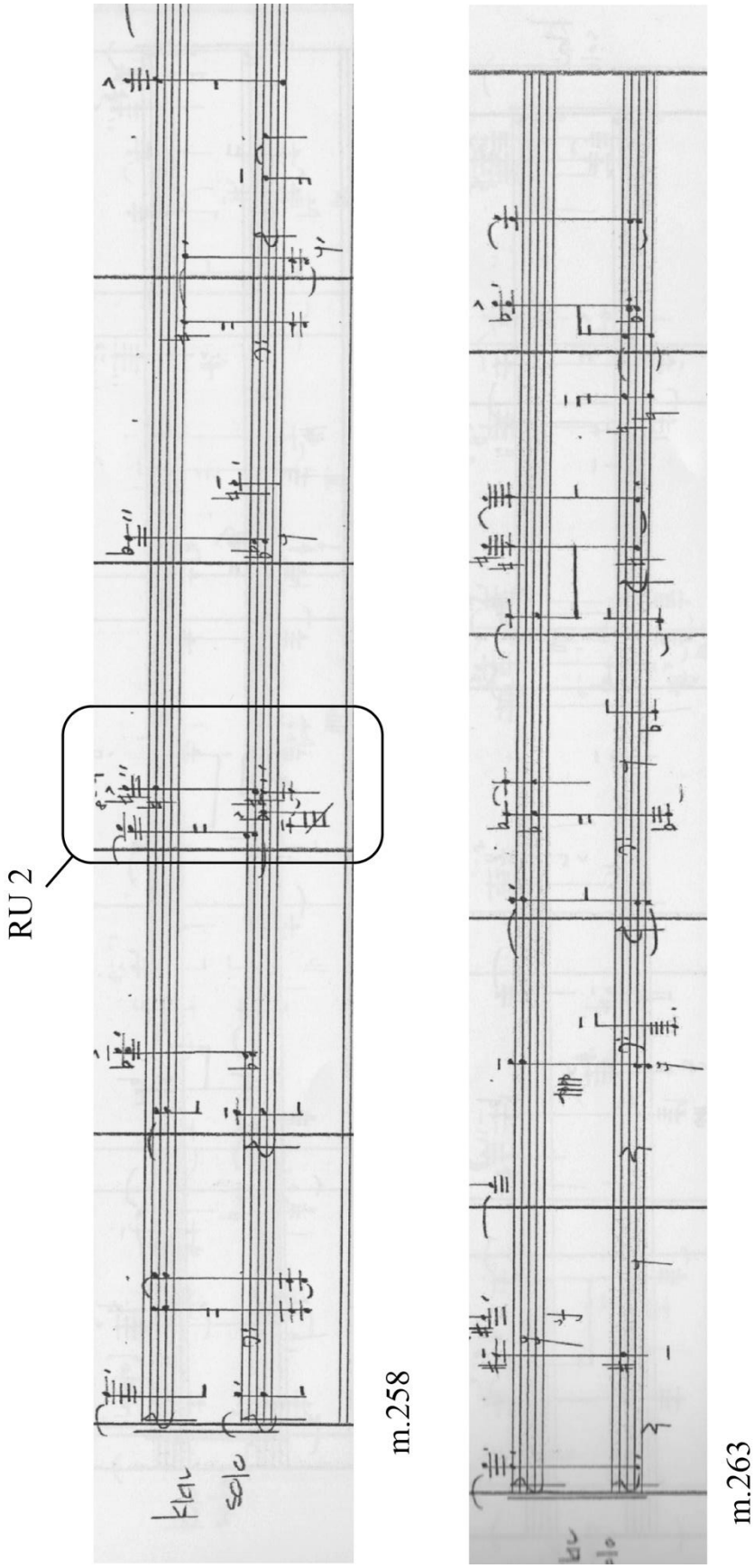

Figure 4.18: RU2 in *Section 2 Response* of Beat Furrer's *Konzert für Klavier und Orchester*

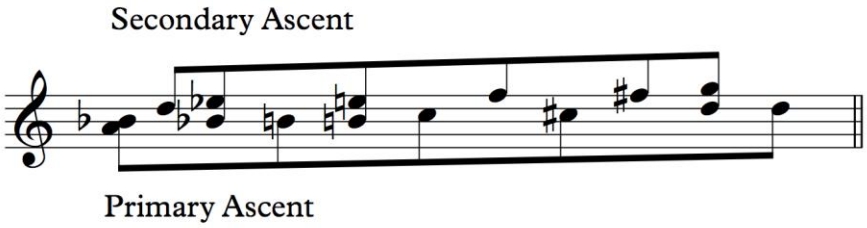

Figure 4.19: Secondary chromatic ascent in RU2 in *Section 2 Response* of Beat Furrer's *Konzert für Klavier und Orchester*

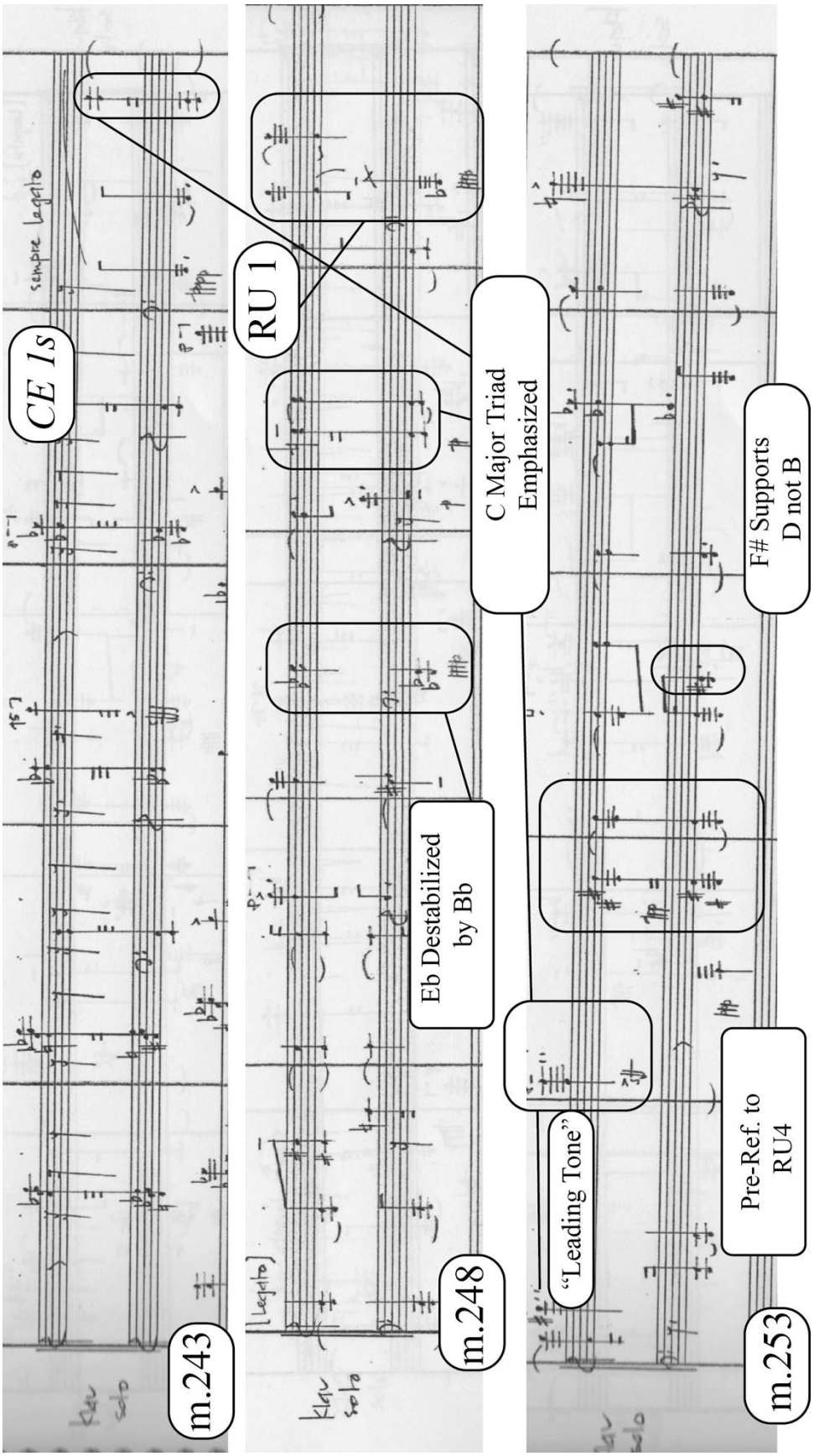

Figure 4.20: RU1 in *Section 2 Response* of Beat Furrer's *Konzert für Klavier und Orchester*

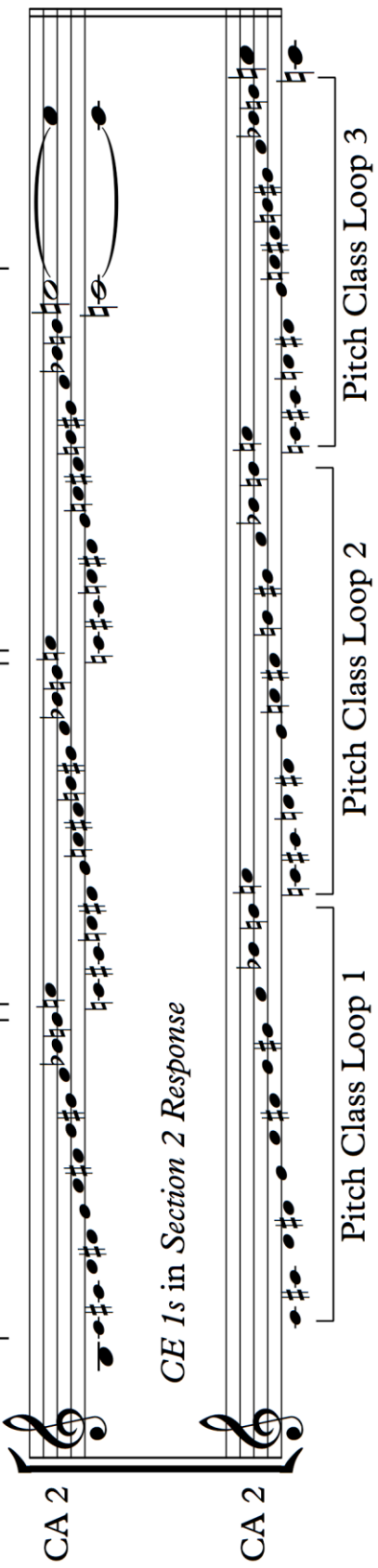

Figure 4.21: Pitch class looping in *Section 2 Response* of Beat Furrer's *Konzert für Klavier und Orchester*

CHAPTER 5

CHROMATIC EVENT TRANSFORMATION AS FORMAL DETERMINANT

Interaction and transformation of four sub-groups of *chromatic events* and *CEG 3* determines the form of *Section 1 Call*:

- *CE 1a* sub-group*: CE 1a, 1c, 1e, 1g, 1i, 1k, 1m* – Table 5.1
- *CE 1b* sub-group*: CE 1b, 1d, 1f, 1h, 1j, 1l, 1n, 1o* – Table 5.2
- *CE 2a* sub-group: *CE 2a, 2b, 2c, 2d, 2e, 2f, 2g, 2h*[31] – Table 5.3
- *CE 4a* sub-group: *CE 4a, 4b, 4c, 4d, 4e, 4g* – Table 5.4
- *CEG 3* – Table 5.5

Four other important *chromatic events* in *Section 1* contain pre-referential material to *Section 2* and *Section 3* in *S1C: CE 10a, CE 5a, CE 6a,* and *CE7a,* shown in Table 5.6. This chapter will examine the *CE 1a* and *CE 1b* sub-groups, the *CE 2a* and *4a* sub-groups, then analyze the pre-referential material presented in *S1C.* After that, a chromatic framework will be presented that connects all *parts* in *Section 1*. This framework will demonstrate that a large-scale pitch class ascent occurs in *Section 1* from pitch class B to C.

[31] *CE 2i* and *2j* are also in the *CE 2a* sub-group, but they do not occur in *Section 1*, so they are not included here.

The *CE 1a* Sub-group and the *CE 1b* Sub-group

Figure 5.1 contains reductions of *chromatic events* that comprise the *CE 1a* and *CE 1b* sub-groups, excluding *CE 1p*. *CE 1p* is the least audibly important of these events, since it only contributes in a small way to the transitional function of *S1T*. Also, the minor second dyad plays a large role in all of these events except for *CE 1p*. Some of these *chromatic events* foreshadow events that happen in *Section 2*. For instance, Chapter 7 will demonstrate that *S2C* begins with a major second ascent of minor second dyads which is foreshadowed by *CE 1d* and *CE 1n*. *CE 1l, 1k,* and *1m* include an overlapping ascent pre-referential to the overlapping descent in *CE 4h*.[32] Like other *chromatic events* in this composition, the first presentation of these sub-groups is highly varied so *CE 1k* and *CE 1l* in *segment 1j* will be examined before *CE 1a* and *1b*.

CE 1k is a six-measure event comprised of a repeating pattern of one measure of minor second dyads followed by one measure of single notes, starting with a pitch class [B C] dyad. The dyads move from B0 to F1, outlining a tritone ascent of minor second dyads. This *chromatic event* occurs on the sixteenth note triplet rhythmic level and is varied by rest substitution. Within this ascent, pitch class B, C, E and F are emphasized, possibly referencing what we will see to be as the important {C E} arrival in *Section 1 Response*.

CE 1k is shadowed by *CE 1l*, a unique event completely dependent on other sounds for identity. *Chromatic events* in the *CE 1b* sub-group, like *CE 1l,* involve sympathetic resonance of the piano strings accomplished by imperceptibly pushing down on piano keys, then engaging the sostenuto pedal, resulting in undampened strings. The

[32] Overlapping pitches that contribute to framework engage tangentially with anticipation or suspension but without resolution.

pitches of the resonant strings follow the ascent in minor second dyads of *CE 1m,* inexorably linking the two *chromatic events*.

The resultant sound is fragile and somewhat impossible to parse out of the musical texture, but is important for two main reasons: it connect the chromatic ascent in the ensemble piano to the solo piano and it adds a third, somewhat random level of pitch generation to the gestural ensemble response in the *call segments*. The ensemble responses that occur on a gestural level "call" *segments* are amplifications of this sympathetic resonance and may actually provide a sort of pitch unity between the solo piano and the ensemble resonance.[33] *CE 1b* sub-group events are clear examples of masked chromatic gestures comprised of sonorities that are more felt than heard, yet still governed by chromatic ascent or descent.

The most important entrance of the *CE 1b* sub-group is *CE 1n,* occurring in the climax of this *Section*, *segment 1o,* shown in Figure 5.2. While the *CE 1a* sub-group and the *CE 1b* sub-group usually work hand-in-hand, at this point, the ensemble piano has abandoned the *CE 1a* sub-group chromatic ascents, leaving *CE 1n* and *CE 1o* as the last events projecting a clear chromatic ascent in *segment 1p*. The chromatic ascents outlined by *CE 1n* and *1o* contribute to establishing the PC 4 pedal in *CE 9c, 8e, 8g,* and *9d,* demonstrated in Figure 5.3.[34] Since CE *1k* and *CE 1l* are the least varied instances of chromatic ascent *S1C*, the other *CE 1a* sub-group and *CE 1b* sub-group events are generated from variations of *CE 1k* or *CE 1l*.

Many of these remaining *chromatic events* outline minor seconds of significance.

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[33] Pianos that I have access to do not result in consistent pitch resonance, but well-maintained pianos my produce reproducible results that influence the pitch material of the ensemble resonance.
[34] This event really starts with *CE 1m* in the *segment 1o*, but is more important in *1p*.

For instance, Figure 5.1 shows that *CE 1m's* diminutive projection of a pitch class B to C ascent is an indicator of the B to C pitch class movement present in *Section 1 Call* as well as a formally significant pre-reference to the B to C movement discussed in Chapter 4 in *Section 2 Response*. Minor second descent also occurs within *CE 1a* itself, since *CE 1a* starts on B0 and drops down to Bb0 before ascending to D1. So, *CE1a* contains minor second descent on a gestural level, or within an individual *chromatic event*. *CE 1c* contains a varied repetition of *CE 1a*, starting on Bb0 and dropping to A0 before ascending to C#1. Also, Figure 5.1 shows that a descending minor second connects *CE 1a* to *CE 1b*, illustrating that minor second relationships occur from one *chromatic event* within a sub-group to another within a different sub-group. Therefore, just looking at the first few *segments* in the composition, chromatic ascent or descent occurs in at least three levels:

- Within individual *chromatic events*
- Between *chromatic events* in the same sub-group
- Between *chromatic events* of different sub-groups

Finally, *CE 1i* is the most varied of the *CE 1a* or *CE 1b* sub-groups as it is unordered and roughly outlines a span of a major sixth: A0 to F# 1. *CE 1a* sub-group events do not occur in a rigid, ordered fashion after *segment 1l*; however, throughout the rest of the composition, an occasional muted low piano note occurs, shown in Figure 5.4. These gestures are post-referential to the *CE 1a* sub-group.

CE 2a – 2j

The *CE 2a* sub-group accounts for all the solo piano music in the "call" *segments* of *Section 1 Call*. All *chromatic events* contained in *CEG 2* contain chromatic connections. A chromatic connection occurs when at least one pitch class from one sonority connects to a pitch class in the following sonority by an ascending or descending minor second. Chromatic connections usually occur between multiple successive sonorities, resulting in a network of chromatically connected gestures. Since only one voice within a sonority must have a relationship with chromatic ascent or descent, the other voices may move about freely. The musical material that results from chromatically connected sonorities contains a seemingly infinite amount of leaping, jagged music manufactured through half step motion. One could say that chromatic connections embody one of the most abstract uses of the chromatic scale to generate musical material in this concerto.

Abstract manifestations of the chromatic scale are crucial to realizing the work-idea of the concerto; they convey a thorough investigation of the ordered chromatic collection, the primary loop that contributes to the work's self-identity. While *chromatic events* in *CEG 2*, which all use chromatic connections, are exclusively in the ensemble piano and solo piano, other *chromatic events* in this concerto use chromatic connections, especially *CE 4s*, the climax of the composition. The following analysis of *chromatic events* contained in *CEG 2* further illustrates the construction and function of chromatic connections, starting with *CE 2d*.

Figure 5.5 contains all of the dyads of *CE 2d* starting on the second eighth note beat of measure 21 and ending with the dyad on the last sixteenth triplet of the first eight

note beat of measure 23. Figure 5.6 shows these dyads with two transformations solely done for the purpose of analysis:

- Incomplete triads are given their chordal major thirds or perfect fifths, resulting in major triads
- Voices have been displaced by octaves to clarify the mechanics of chromatic connections[35]

When triads are presented by the solo piano in this concerto, they are almost exclusively major triads. Within this context, perfect fourth, minor third, minor sixth, major sixth, or perfect fifth dyads can be understood as incomplete triads.

The top stave in Figure 5.6 shows the root motion of the chords that comprise *CE 2d*. The roots are related by two minor second descents, a leap upward of a minor third, a major second ascent, a perfect fourth ascent, a minor second descent, a major second ascent, and finally a drop of a major third. This root motion accounts for every intervallic distance except the tritone. The second stave in Figure 5.6 demonstrates that chromatic connections occur between one, two, or three voices of successive chords.

Tritones are critical sonorities in this concerto, so finding root motion by tritone in chromatically connected chords is important, so Figure 5.7 contains a reduction of *CE 2a.* subject to the same analytical transformations of Figure 5.6. The B major triad in Figure 5.7 moves to an F major triad, showing a root relationship of the tritone, as does the C major triad moving to the Gb major triad. Therefore, *CE 2a* and *CE 2d* combined contain major triad root movement of all interval classes, allowing for the following assertion: any major triad moving to another major triad has a chromatic connection in at least one

[35] Voice does not represent a polyphonic texture but refers to a note within a chord.

voice, shown in Figure 5.8.

A significant limitation of using the chromatic scale to generate material is the minor second. It is difficult to create relationships between successive sounds that are not dominated by half step motion. Chapter 4 shows how Furrer overcomes this fairly severe limitation in *Section 2 Response* by setting in motion two chromatic ascents moving at different rates of speed, resulting in intervallic expansion. In *CEG 2* events, he uses chord inversion in combination with chromatic connections to vary material, allowing for the creation of angular textures whose half-step relationships are somewhat obscured. For instance, chords that are a minor second apart obviously plane a minor second up or down in pitch class, resulting in a fairly narrow range of music, but using inversions of chord creates wide leaps even with chords whose roots are a second apart, shown in the sixth, seventh, and eighth chords of Figure 5.9. This is not the only variation applied to events in *CEG 2*. Throughout *Section 1 Call*, *CEG 2* events increase in tessitura, vertical density, and horizontal density, but always retain their chromatic connections.

CEG Synergy

The musical elements of the *CE 1a, 1b,* and *2a* sub-groups work together to determine the identity of each "call" *segment* and transformation of these *chromatic events* determines the form of *Section 1*. *CEG 2* dyads or chords are always followed by ensemble resonance. Therefore, the combination of the *CE 2a* sub-group, ensemble resonance, and *CE 1b* sub-group results in one interdependent sonority: a piano dyad, an ensemble resonance, and sympathetic piano string resonance, shown in Figure 5.10. The

CE 2a sub-group ascends in tessitura, note frequency, and note density throughout the "call" *segments*, separating itself from the *CE 1a* sub-group and encroaching on sympathetic resonance of the *CE 1b* sub-group and the ensemble resonance. The processes applied to the *CE 2a* sub-group result in the changing roles of other *chromatic events* in the "response" *segments* of *Section 1*.

CEG 3

CEG 3 and the *CE 4a* sub-group form the core group of *chromatic events* that define "answer" *segments* in *Section 1*, starting with *segment 1c*, shown in Figure 5.11. All *CEG 3* events involve a solo piano ostinato that occurrs at the rhythmic level of the sixteenth note triplet. These events use two unique pitch collections: PCo 10 and PCo 10a, given in Tables 5.7 and 5.8. PCo 10 is a twenty-seven note ordered collection and PCo 10a is a truncated twenty-one note version of PCo 10. Neither of these pitch collections has a relationship with PCo 1. The far left column in Table 5.8 relates PCo 10 rows to PCo 10a rows. PCo 10a is related to PCo 10 by the transposition of a major sixth. For example, *CE 3a* in *segment 1c* is labeled as TE PCo 10a, corresponding to notes 7 – 27 of T7 PCo 10.

Following the established pattern, *CE 3a* is one of the most varied instances of *CEG 3*. The original, unvaried version occurs in *CE 3f* in *segment 1n*, shown in Figure 5.12. *CEG 3* is similar to *CEG 6* in that variation occurs by half step transposition at each repetition of an ostinato. However, *CEG 3* is less varied than *CEG 6*, consistently performed on the piano, never intensely harmonized, and remains at the sixteenth note triplet level. The core, unvaried ostinato is an arpeggiated gesture, but within the context

of this composition remains fairly low and contained. Additionally, the twenty-seven note structure of the ostinato gives a long form 9:8 feel on the eighth note rhythmic level. That is, every nine eighth notes, the ostinato will repeat, which is asynchronous with the rhythm of the concerto.

Each instance of *CEG 3* is varied in a unique way with *CE 3d* representing the least varied version from *CE 3f*. *CE 3d* is a single T0 PCo 10 ostinato without repeat or transposition. If it were not for the two unique trichords that occur at the end of the gesture, shown in Figure 5.13, *CE 3d* would constitute the unvaried occurrence of *CEG 3*. *CE 3e* starts on T0 PCo10 and transposes up to T4 PCo 10 by half step. Certain notes are delayed by one sixteenth note triplet in *CE 3e*, creating rests as well as dyads or trichords, demonstrated in Figure 5.14. *CE 3c* begins on T9 of PCo10, rising to T0 PCo 10, and uses a similar process as *3e* to vary the material with one major difference: there is a sixteenth note triplet rest inserted in the first ostinato which pulls the ostinato out of synchronization with the meter of the composition, shown in Figure 5.15.

CE 3a and *3b* use PCo 10a instead of PCo 10, demonstrating a unique property inherent in PCo 10: nested chromatic ascent. Figure 5.16 illustrates a chromatic ascent that occurs in *CE 1b*, resulting from T0 PCo 10a, the final twenty-one notes of T8 PCo 10. This ascent occurs in all *CEG 3* events at a faster rate of speed than the ostinato transpositions, but is accentuated by truncating PCo 10 in *CE 3a* and *3b*. *CE 1a*, the first and most varied *chromatic event* in *CEG 3,* features a crippled secondary ascent, shown in Figure 5.17. The last four notes are taken from notes 16, 17/18, and 19 T4 of PCo 10, or 10, 11/12, 13 T8 of PCo 10a.

Finally, *chromatic events* in *CEG3* contain a complete, but masked, *Section*-long

chromatic ascent despite the fact that neither T8 of PCo 10, nor T7 of PCo 10 is present. The relationship between PCo 10 and PCo 10 is such that TE PCo 10a and T0 PCo 10a are related to T7 PCo 10 and T8 PCo 10, respectively. Therefore, *CE 3a* and *3b* account for T7 PCo 10 and T8 PCo 10, respectively – in turn accounting for transposition by the complete chromatic scale, illustrating that a nested s*egment*-length chromatic ascent transposes all *chromatic events* in *CEG 3*, shown in Figure 5.18.

CE 4a – 4g

All *CEG 4* events are sustained and many of them last for the duration of fifteen sixteenth notes. In *Section Call 1*, the *CE 4a* sub-group: *CE 4a, 4b, 4c, 4d,* and *4g* contains two vertical sonorities that alternate. When these sonorities are combined, they account for the complete chromatic collection. These alternating sonorities are re-orchestrated from "response" *segment* to "response" *segment*, highlighting different pitch arrangements, which in turn emphasizes different pitches.

Figure 5.19 shows a pitch class reduction of the *CE 4a* sub-group that accentuates interesting attributes of the *CE 4a* sub-group. As in other sub-groups, dissonant intervals like minor seconds and tritons are important. For instance, Figure 5.19 shows a clear T1 relationship between *CE 4a* and *4b*. *CE 4d* contains minor second tritones separated by minor thirds in the first sonority, so it is the only sonority not based on an [0123] trichord. Also, while most of the alternating sonorities contain complimentary pitch classes, *CE 4c* and *4g* share pitch classes, functioning as quasi-anticipations. All the sonorities in Figure 5.19 function as pedals in "response" *segments* and eventually end up toppling over to become the overlapping descent *CE 4h.* The *CE 4a* sub-group is pre-

referential to the climax since the climactic moment of the entire composition consists of two alternating sustained chords. Finally, alternating between two sonorities is another example of the "call and response" looping that provides identity for the concerto, shown in Figure 5.20.

CE 5b

The events analyzed in this paper up to this point have contained similar, parallel, or oblique motion; however, *CE 5b* has two voices moving in contrary motion. Any two voices moving in contrary motion, from the perspective range, will inevitably meet once or never meet, but in terms of pitch class are always destined to cross. The moment before and the moment after they do, they will engage in some form of voice exchange, which is clearly demonstrated in the reduction of *CE 5b* Figure 5.21.

Contrary chromatic motion resulting in voice exchange is not a new idea, described in a tonal context Robert Gauldin:

> Schubert uses a contrary chromatic progression in the final strophe of his "Der Wegweiser" to depict the endless "road from which no traveler returns," in which the "road" symbolically refers to death. Here the tritone exchange (B to F), which serves to prolong the V7 of C major, is not completed but instead breaks off at the bass E2, which then leads back to a cadence in the original tonic of G minor. If the pattern had continued in strict order, it would eventually have cycled back on itself in an endless manner.[36]

Gauldin is describing voice exchange that results in prolongation, but that is not how voice exchange is used in the context of this composition. In *CE 5b*, Furrer is using the stasis that Gauldin alludes to that is inherent in chromatic voice exchange to create a

[36] Robert Gauldin, *Harmonic Practice in Tonal Music* (New York.: W.W. Norton, 2004), 709.

texture that projects the contradiction of moving stasis.[37] Chromatic voice exchange fulfills other roles in this concerto including pitch class emphasis and ascent and descent in chromatic framework.

All events of the *CE 5a* sub-group engage in voice exchange and share the following attributes:

- They consist of arpeggiated string pizzicato
- They span nearly the entire effective range of the strings as a family, not including the double bass
- They occur in a 9:8 sixteenth note rhythm
- They contain outer voice motion, mostly harmonized in tritones

It is always difficult to hear *CE 5a* events, similar to the *CE 5b* sub-group, but the voice exchange that occurs during these events usually has formal significance.

Figure 5.22 has reduced the *chromatic events* contained in the *CE 5a* sub-group to their outer voices, displaced by octaves, for easier analysis. Following the pattern established, *5a* is the most varied and *5h* is the least varied instance. The inner voices of these arpeggiations provide pedals and similar and contrary motion that the outer voices converge or diverge against but do not follow any set pattern. A few repetitions into *CE 5a,* a rhythmic diminution occurs, resulting in overlap between the final note of the arpeggiation and the first note of the next pattern, creating an arpeggiation chain, shown in Figure 5.23. *CE 5a* and *5c* do not plane tritones in the lower two voices, avoiding voice exchange early in the gesture in order to accentuate the unison voice exchange occurring on pitch class E in measure 82. The emphasis of pitch class E triggers a very

[37] Another aspect of chromatic voice exchange that Gauldin hits on is the crippling of an infinite process, to how the mensuration canon in *S1R* is presented.

important event, *CE 9a*, a sustained E pedal. This pedal marks the beginning of pitch class E functioning to resolve the ambiguity in *Section 1 Call* between B and C. *CE 5e* contains a pitch class Bb to E voice exchange, echoed in the first and second chords of *CE 4m* by the trumpet move from Bb4 to E5. *CE 5h* demonstrates the most static voice exchange this gesture can project, a complete exchange from starting pitch to ending pitch in the lower and upper voices.

CE 4h – Unlikely Brace for Pitch Class E

The faint, mostly stepwise descent of *CE 4h*, shown in Figure 5.24, contributes to the transitional nature of *Section 1 Transition*, including its arrival on pitch class E, which is emphasized by the E1 in the double bass in measure 111. *CE 4h* contains overlapping sustained notes, as each step in the descent is comprised of a fifteen sixteenth note sustain that begins after a sixteenth note rest, resulting in a two measure gesture. The entrances of each downward step occur every measure, resulting in a chain of overlapping intervals. Some notes in the descent are marked with microtones, shown in Figure 5.25. These microtones infer different fundamental pitches, so interesting observations can be made about *CE 4h* in terms of its relationship to tuning, fundamentals, and form.

Figure 5.26 shows a reduction of *Section 1 Transition* arriving at *Section 1 Response* containing: *CE 4h, CE 7e, CE 8h*, and the arrival, *CE 4i*. *CE 4h* is the sole event in this concerto that utilizes microtones. Since *CE 4h* contains sustained tones, it highlights the oppositional relationship of the piano and the ensemble in two fairly subtle ways: 1) the pianoforte's ability to perform sustained notes is limited and 2) the pianoforte's capacity for expressing microtones is limited to the harmonic series.

Therefore, it is important to ask if the piano can *actually* perform the harmonics the winds and brass present in *CE 4h*. Indeed it can, as all the microtones are partials of E or G, so instead of conveying opposition, the microtones actually demonstrate unity between the ensemble and the piano, albeit at a fringe.

Both the seventh and eleventh partials in the harmonic series are flatter than equal temperament. The seventh partial is thirty-one cents flat and the eleventh partial is forty-nine cents flat. The double bass part in measure 105, a notated C5 fifty cents sharp with an indication for a natural harmonic, presents an excellent example of the relationship between Furrer's notation, harmonic partials, and fundamental frequencies. Because of the natural harmonic indication, this partial must exist off one of the open strings of the double bass: E1, A1, D2, or G2.

The fourteenth partial off D2 is written sometimes as a C, but the resulting pitch would be extremely difficult, if not impossible to produce. It would also end up being thirty-one cents flat, not fifty cents sharp. A fourteen cent flat C# is available as the tenth partial off the A string, which is a little closer than the partial off the D string; however, the partial that fits nearly perfectly with this notation is the eleventh partial off the G string. A standard notation of this partial would be a notated C#5 forty-nine cents flat, but a C5 fifty cents sharp is a perfectly reasonable alternative. The one-cent difference would not be noticeable and no other natural harmonic really comes close.

Therefore, the other microtonal intervals marked as fifty cents sharp are actually eleventh partials off differing fundamentals. This may seem like a stretch, but the A5 fifty cents sharp in measure 97 and the A4 fifty cents sharp in measure 107 imply the twenty-second and eleventh partials off an important fundamental that actually arrives:

E1 in measure 111. Additionally, the D5 thirty cents flat in measure 104 implies the fourteenth partial off E1. The fifty cents sharp C2 bass harmonic, paired with flute, is the only partial that does not imply E1; it implies the G2 of the contrabass. Therefore, the microtonal pitches actually help to establish E as an important pitch class in this *Section*.[38]

Purposefully highlighting pitch class E reveals an important relationship between C and E as well as B and E. Previously, using Boatwright's justification, a perfect fourth was shown to demonstrate acoustic privilege to the upper note of the fourth; however, it functions in another role here, namely that of a dissonance. Knud Jeppesen writes about the dual nature of the interval of a fourth in reference to sixteenth century counterpoint:

> The fourth however, occupies a very particular, individual position: it hovers between consonance and dissonance and under certain circumstances which will be discussed later, can be treated as a consonance. But as a rule, the fourth is considered a dissonance.[39]

While the fourths earlier strengthened the upper notes of the dyads, the fourth here, between E and B, needs to resolve, especially with the strengthening of E through the descent, *CE 4r*. The B, however, does not *resolve*. It *dissolves*. Pitch class B is absorbed into E through the overtone-based descent of *CE 4r*, leaving space for the arrival of C in *Section 1 Response*.

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[38] Having demonstrated that, there is a projection of the conflict between the harmonic series and equal temperament in the arrival of *S1R*: the first clarinet plays the eleventh partial off C1 while the second clarinet plays an equal tempered F#, creating a blurred pitch-noise hovering far above the C1 pedal.
[39] Knud Jeppesen, *Counterpoint, the Polyphonic Vocal Style of the Sixteenth Century*, trans. by Glen Haydon (New York: Dover, 1992), 98.

Pre-referential *Chromatic Events*

A final attribute of *Section 1* is that pre-referential *chromatic events* are introduced that contribute to the chromatic framework in *Section 1*, then recur in *Section 2* and *Section 3*, often providing a different musical or formal function. For instance, *CE 9c* and *9d* first appear in *segment 1o and 1p* then occur throughout the composition, in varied form. *Chromatic events* in *CEG 9* provide the longest rhythmic level of sustain of any *chromatic event*, shown in Figure 5.27. These sustained *chromatic events* foreshadow the climax of the entire composition in *segment 3h*, shown in Figure 5.28. Also, *CE 4f* illustrates how *CEG 4* is used as a sustained pedal, its primary role in the rest of the composition, while the *CE 4h* non-chromatic descent is pre-referential to *1s* and *1t*. *CE 5c* also recurs and is a highly masked simultaneous chromatic ascent and descent performed on rin on timpani, resulting in completely static voice-crossing voice exchange, shown in Figure 5.29.

Most *CEG 6* events contain elements of *CE 6a*: thirty-second note ostinato-based gestures that use PCo1-based pitch collections, rest substitution, and chromatic transposition, shown in Figure 5.30. The moving articulated pedals *CE 10a* and *10b* involve glissandi and recur throughout *Section 2* and *Section 3*, shown in Figure 5.31. *CE 10c* is pre-referential to all the sixteenth note triplet figures in the ensemble in *Section 2* and *Section 3*, shown in Figure 5.32. The sixteenth note triplet rhythmic level is abandoned by the solo piano at the completion of *CE 3f.* Any number of articulated string pedals can trace their genesis back to *CE 8a*, shown in Figure 5.33. *CE 8f* importantly pre-references the articulated pedals that occur on the level of the quintuplet sixteenth note, demonstrated most prominently in *CE 7h*, shown in Figure 5.34. Finally,

CE 7a involves the highest note on the piano and is used in the developmental material of *segment 3b* and is pre-referential to the important arrival of the mensuration canon in *Section 2 Response*, shown in Figure 5.35.

Chromatic Framework

Now that many *chromatic events* contained in *Section 1* have been discussed, a reduction of *Section 1* can be made, shown in Figure 5.36. This reduction reveals a chromatic framework which helps organize the musical material of *Section 1.* In this reduction, only the prominent notes, chosen based on orchestrational strength, are shown for events for CE *4a, 4b, 4c, 4d, 4e*, and *4g*. While a more thorough explanation of chromatic framework occurs in Chapter 7, one can see here that this framework demonstrates that one of the more important attributes of *Section 1* is the continuous shifting from pitch class B to pitch class C, which is supported and subverted by pitch class E. Emphasis on pitch class C occurs at different speeds, the first being *CE 7a. CE 4f* is the most insistent event that represents the tension between the C and B. The tension between B and C is present throughout S*ection 1* until resolved by the descent of *CE 4h.*

Table 5.1: The *CE 1a* sub-group in Beat Furrer's *Konzert für Klavier und Orchester*

CE 1a Sub-Group			
ID	Location	Instrument	Notes
CE 1a	1a	Ensemble Piano	T, E, 0, 1, 2 Rising Chromatic Ascent
CE 1c	1b	Ensemble Piano	9, T, E, 0, 1 Rising Chromatic Ascent
CE 1e	1d	Ensemble Piano	T, E, 0, 1, 2 Rising Chromatic Ascent
CE 1g	1f	Ensemble Piano	T, E, 0, 1, 2 Rising Chromatic Ascent
CE 1i	1h	Ensemble Piano	{9E012356} Free, loose wedge with moment on 3
CE 1k	1j	Ensemble Piano	[E0], 0, [01], 1, [02], 2, [23], 3, [34], 4
CE 1m	1l	Ensemble Piano	E, [E0], 0 2-bars each

Table 5.2: The *CE 1b* sub-group in Beat Furrer's *Konzert für Klavier und Orchester*

CE 1b Sub-Group			
ID	Location	Instrument	Notes
CE 1b	1a	Solo Piano	[TE0], [E01], [01], [012], [12]
CE 1d	1b	Solo Piano	[9T], [E0], [12]
CE 1f	1d	Solo Piano	[TE], [E0], [01], [12]
CE 1h	1f	Solo Piano	[TE], [E1], [12]
CE 1j	1h	Solo Piano	[TE], [12]
CE 1l	1j	Solo Piano	[E0], [01], [12], [23], [34]
CE 1n	1o	Solo Piano	[01, [23]
CE 1o	1p	Solo Piano	[23], [34]

Table 5.3: The *CE 2a* sub-group in *Section 1* of Beat Furrer's *Konzert für Klavier und Orchester*

CE 2a Sub-Group			
ID	Location	Instrument	Notes
CE 2a	1a	Solo Piano	Slide/Plane Piano Dyads (implying major triads)
CE 2b	1b	Solo Piano	Slide/Plane dyads or triads (major or implying major)
CE 2c	1d	Solo Piano	Slide/Plane dyads or triads (all major or minor except on M2 dyad)
CE 2d	1f	Solo Piano	Slide/Plane dyads, triads [major/minor], or trichords [025] [027]
CE 2e	1h	Solo Piano	Slide/Plane dyads, triads [major/minor], or trichords [025] [027]
CE 2f	1j	Solo Piano	Slide/Plane dyads, triads [major/minor], trichords [025] [027], or hexachords mostly with a [017] sound in the bass and a major or minor triad on top
CE 2g	1l	Solo Piano	Slide/Plane dyads, triads, trichords, tetrachords, hexachords, heptachords, or octachords with occasional P5 clusters
CE 2h	1m	Solo Piano, Ensemble Piano	Slide/Plane Varied Chromatic Material

Table 5.4: The *CE 4a* sub-group in Beat Furrer's *Konzert für Klavier und Orchester*

CE 4a Sub-Group			
ID	Location	Instrument	Notes
CE 4a	1c	Winds, Brass, Acc., Crotales, Strings	Chord 1 [234589TE] Chord 2 [0167]
CE 4b	1e	Winds, Brass, Acc., Crotales, Strings	Chord 1[345689TE0] Chord 2 [1278]
CE 4c	1g	Winds, Brass, Acc., Crotales, Strings	Chord 1 [23489T] Chord 2 [E014567]
CE 4d	1i	Winds, Brass, Acc., Crotales, Strings	Chord 1 [014567TE] Chord 2 [2389]
CE 4e	1k	Winds, Brass, Acc., Crotales, Strings	Chord 1 [012346789T] Chord 2 [67E0]
CE 4g	1n	Winds, Brass, Acc., Crotales, Strings	Chord 1 [2345789TE] Chord 2 [E0167]

Table 5.5: *CEG 3* in Beat Furrer's *Konzert für Klavier und Orchester*

CEG 3			
ID	Location	Instrument	Notes
CE 3a	1c	Solo Piano	TE - PCo 10a
CE 3b	1e	Solo Piano	T0 - PCo 10a
CE 3c	1g	Solo Piano	T9, TT, TE, T0, T1 - PCo 10 w/rests
CE 3d	1i	Solo Piano	T0 - PCo 10
CE 3e	1k	Solo Piano	T0, T1, T2, T3, T4 - PCo 10 w/shifts
CE 3f	ln	Solo Piano	T3, T4, T5, T6 - PCo 10 hemiola 4:9

Table 5.6: Pre-referential *chromatic events* in *Section 1* of Beat Furrer's *Konzert für Klavier und Orchester*

ID	Location	Instrument	Notes
CE 10a	1g	Vln. 2, Vla., Vc.	[12378] - [3459T] 8-bar M2 Ascending Glissandi
CE 5a	1l	Vln. 1 + 2, Vla., Vc.	[E5], [06], [17], [28], [39] Upper Voice Ascent w/[T4], [93], [82], [71], [60] Lower Voice Descent
CE 6a	1l	Pco 2	Two expanding to five voice 16-note transposed ostinato
CE 7a	1d	Esnemble Piano	0 - Articulated Pedal High Octave

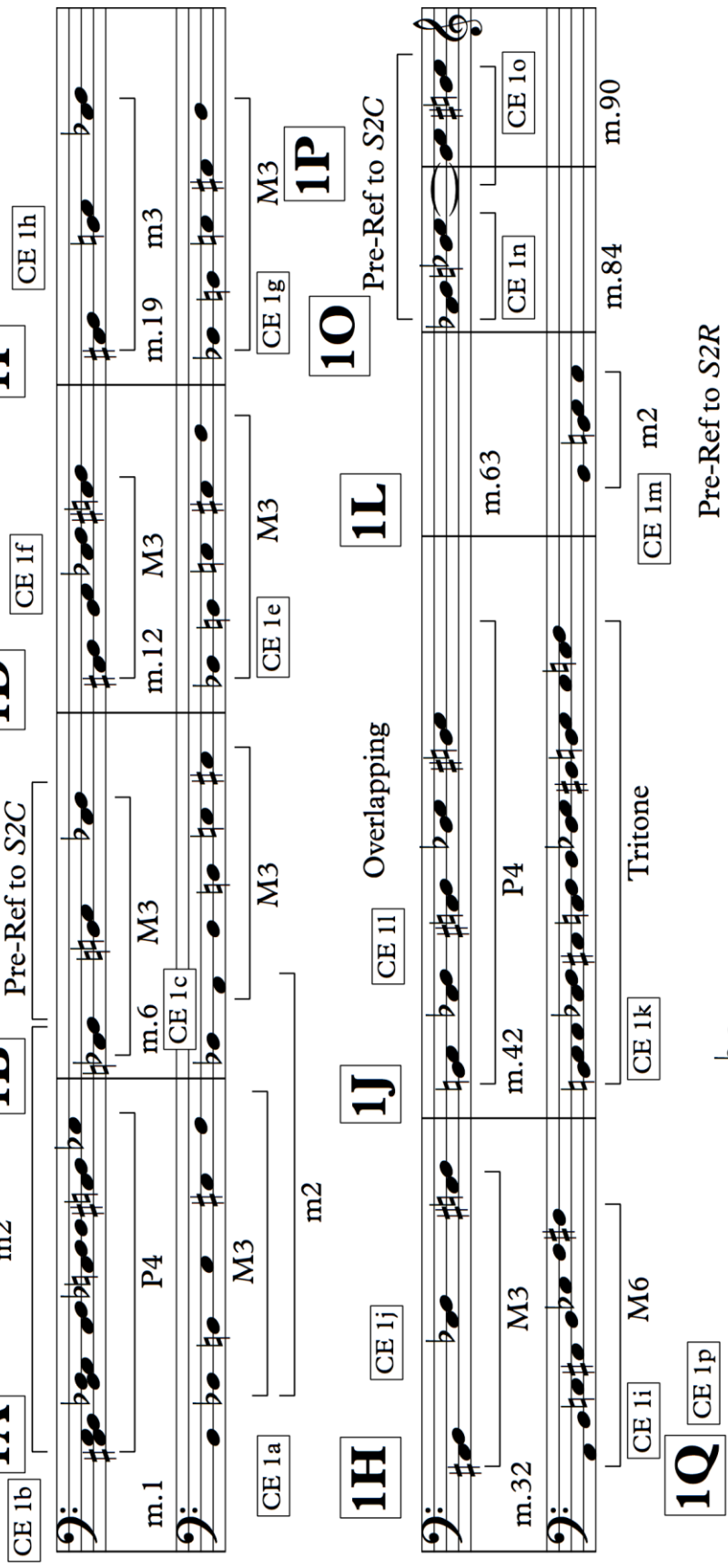


Figure 5.1: Reduction of the *CE 1a* and *CE 1b* sub-group in *Section 1* of Beat Furrer's *Konzert für Klavier und Orchester*

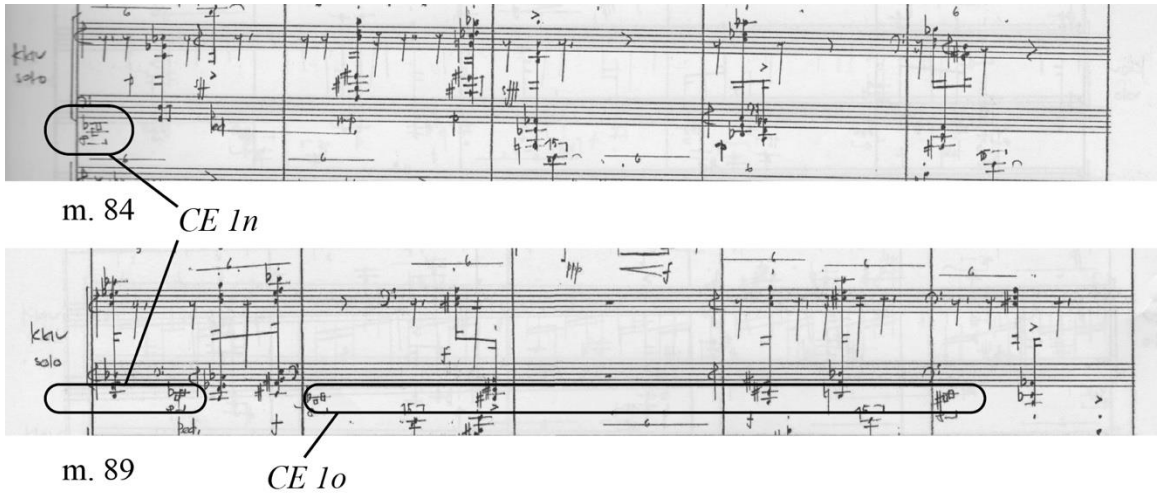


Figure 5.2: Reduction of the *CE 1n* and *CE 1o Section 1* of Beat Furrer's *Konzert für Klavier und Orchester*

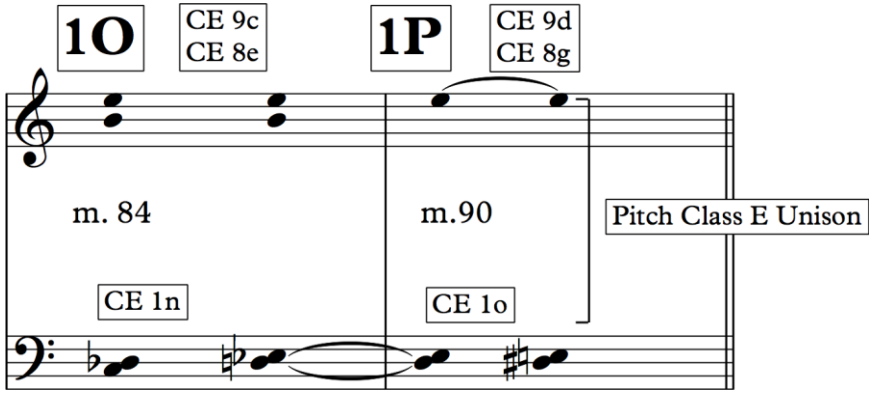


Figure 5.3: Reduction of the *CE 1n* and *CE* contribute to establishing pitch class E in *Section 1* of Beat Furrer's *Konzert für Klavier und Orchester*

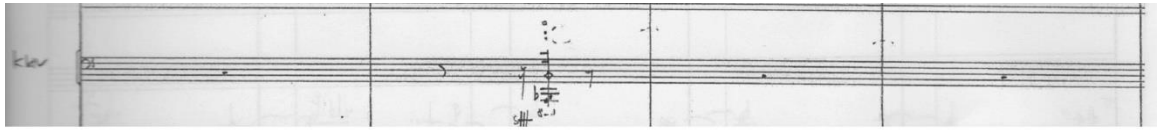


Figure 5.4: Low muted piano note in *Section 3* of Beat Furrer's *Konzert für Klavier und Orcheser* post-referential to the *CE 1a* sub-group

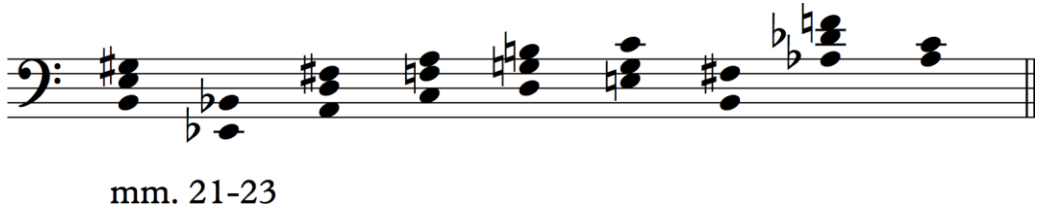


Figure 5.5: Reduction of the *CE2a* sub-group solo piano music in mm. 21 – 23 of Beat Furrer's *Konzert für Klavier und Orchester*

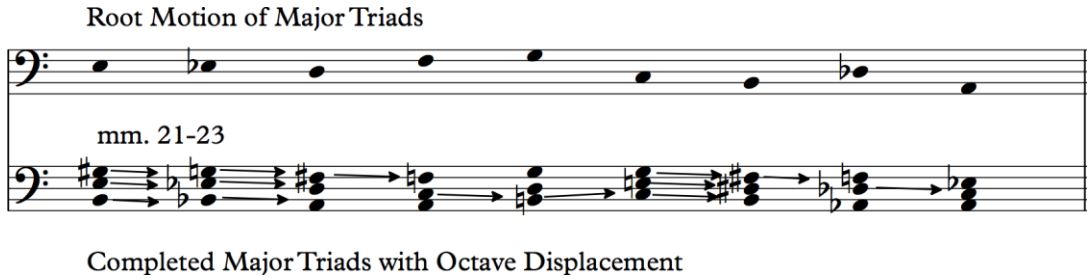


Figure 5.6: Root motion and chromatic connections in mm. 21 – 23 of Beat Furrer's *Konzert für Klavier und Orchester*

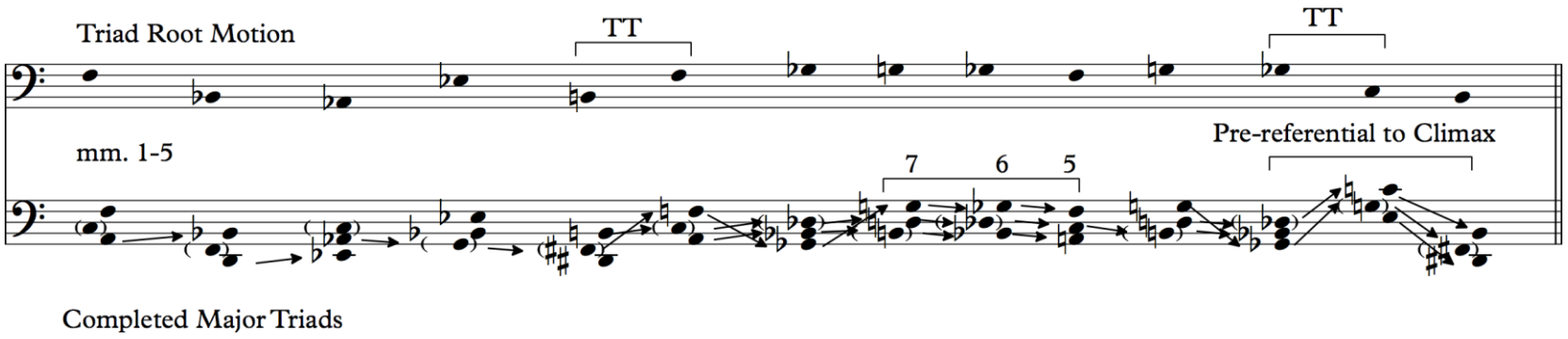


Figure 5.7: Reduction of the *CE2a* sub-group solo piano music in mm. 21 – 23 of Beat Furrer's *Konzert für Klavier und Orchester*

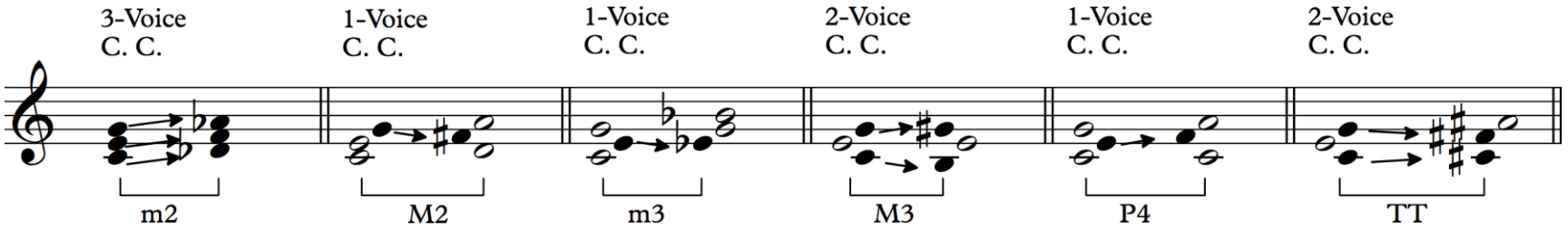


Figure 5.8: Chromatic connections between all major triads

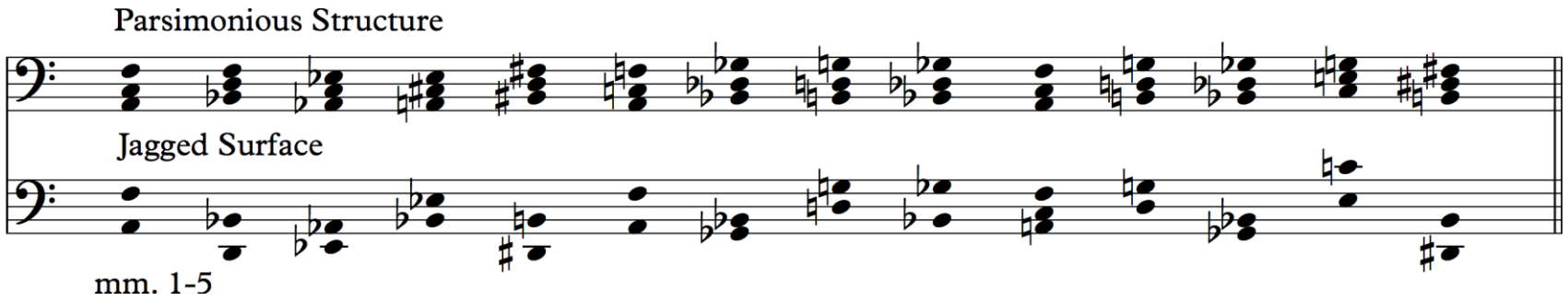


Figure 5.9: Parsimonious structure compared with jagged surface of *CE 2a* in mm. 1 – 5 of Beat Furrer's *Konzert für Klavier und Orchester*

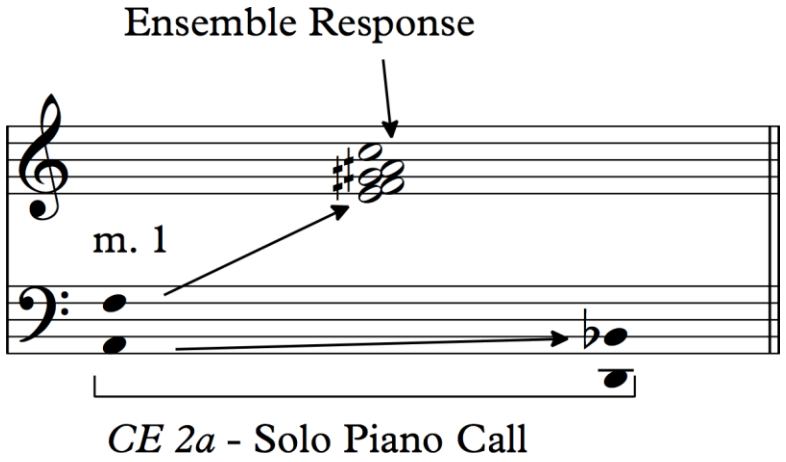


Figure 5.10: Ensemble response to *CE 2a* call in m. 1 of Beat Furrer's *Konzert für Klavier und Orchester*

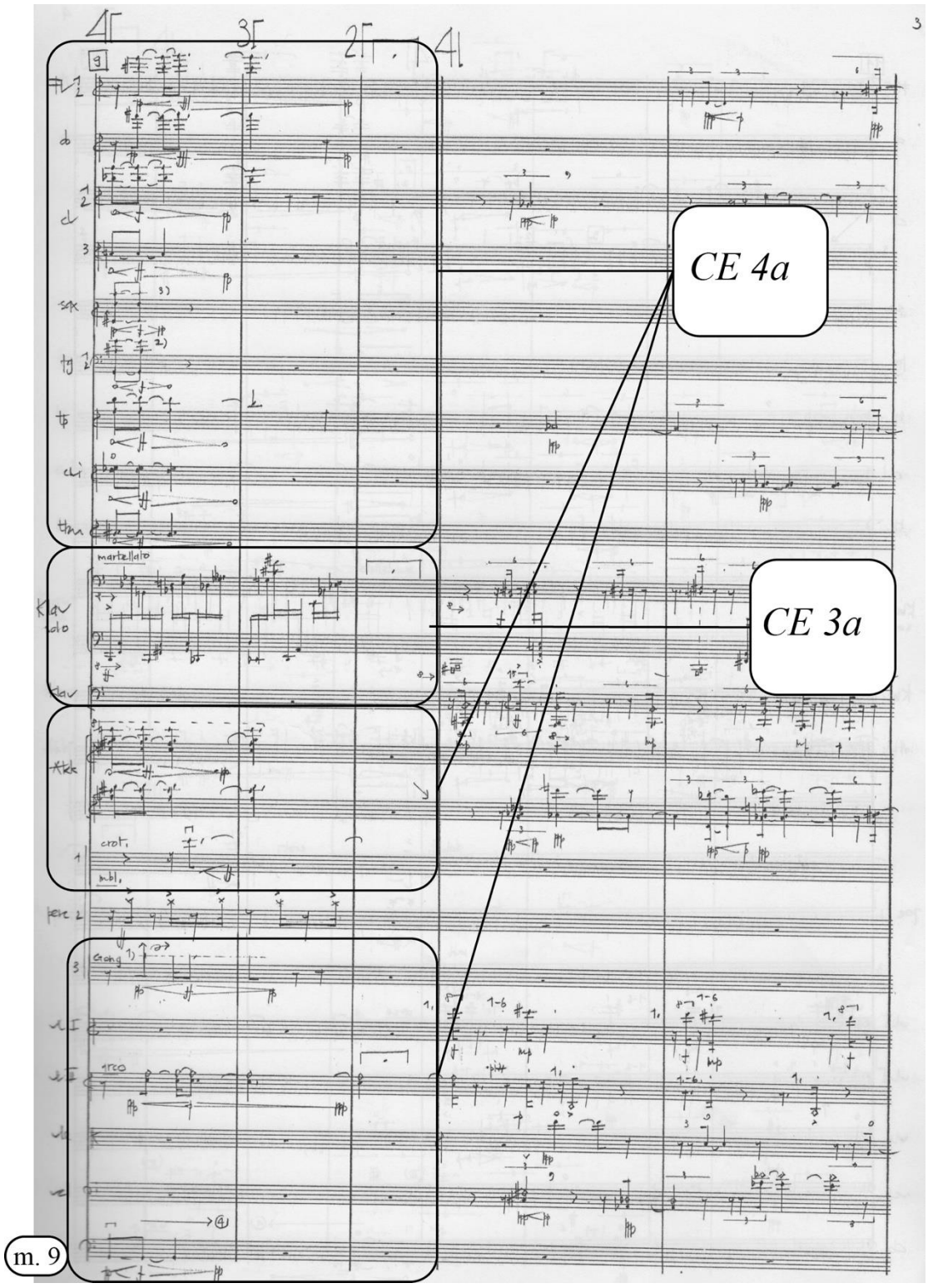


Figure 5.11: The *CE 4a* sub-group and *CEG 3* events comprise the response *segments* in *Section 1* of Beat Furrer's *Konzert für Klavier und Orchester*

Table 5.7: PCo 10 used in Beat Furrer's *Konzert für Klavier und Orchester*

Pitch Collection 10																										
0	6	1	8	2	9 7	4	10	5	11 6	0	5	4 11	7 3	2 9	5 0	6	6	1 11	7	8	9	8 3	10 5	11	0	11 6
1	7	2	9	3	10 8	5	11	6	0 7	1	6	5 0	8 4	3 10	6 1	7	7	2 0	8	9	10	9 4	11 6	0	1	0 7
2	8	3	10	4	11 9	6	0	7	1 8	2	7	6 1	9 5	4 11	7 2	8	8	3 1	9	10	11	10 5	0 7	1	2	1 8
3	9	4	11	5	0 10	7	1	8	2 9	3	8	7 2	10 6	5 0	8 3	9	9	4 2	10	11	0	11 6	1 8	2	3	2 9
4	10	5	0	6	1 11	8	2	9	3 10	4	9	8 3	11 7	6 1	9 4	10	10	5 3	11	0	1	0 7	2 9	3	4	3 10
5	11	6	1	7	2 0	9	3	10	4 11	5	10	9 4	0 8	7 2	10 5	11	11	6 4	0	1	2	1 8	3 10	4	5	4 11
6	0	7	2	8	3 1	10	4	11	5 0	6	11	10 5	1 9	8 3	11 6	0	0	7 5	1	2	3	2 9	4 11	5	6	5 0
7	1	8	3	9	4 2	11	5	0	6 1	7	0	11 6	2 10	9 4	0 7	1	1	8 6	2	3	4	3 10	5 0	6	7	6 1
8	2	9	4	10	5 3	0	6	1	7 2	8	1	0 7	3 11	10 5	1 8	2	2	9 7	3	4	5	4 11	6 1	7	8	7 2
9	3	10	5	11	6 4	1	7	2	8 3	9	2	1 8	4 0	11 6	2 9	3	3	10 8	4	5	6	5 0	7 2	8	9	8 3
10	4	11	6	0	7 5	2	8	3	9 4	10	3	2 9	5 1	0 7	3 10	4	4	11 9	5	6	7	6 1	8 3	9	10	9 4
11	5	0	7	1	8 6	3	9	4	10 5	11	4	3 10	6 2	1 8	4 11	5	5	0 10	6	7	8	7 2	9 4	10	11	10 5
0	6	1	8	2	9 7	4	10	5	11 6	0	5	4 11	7 3	2 9	5 0	6	6	1 11	7	8	9	8 3	10 5	11	0	11 6
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27

Table 5.8: PCo 10a used in Beat Furrer's *Konzert für Klavier und Orchester*

PC10	Pitch Collection 10a																				
0	4	10	5	11 6	0	5	4 11	7 3	2 9	5 0	6	6	1 11	7	8	9	8 3	10 5	11	0	11 6
1	5	11	6	0 7	1	6	5 0	8 4	3 10	6 1	7	7	2 0	8	9	10	9 4	11 6	0	1	0 7
2	6	0	7	1 8	2	7	6 1	9 5	4 11	7 2	8	8	3 1	9	10	11	10 5	0 7	1	2	1 8
3	7	1	8	2 9	3	8	7 2	10 6	5 0	8 3	9	9	4 2	10	11	0	11 6	1 8	2	3	2 9
4	8	2	9	3 10	4	9	8 3	11 7	6 1	9 4	10	10	5 3	11	0	1	0 7	2 9	3	4	3 10
5	9	3	10	4 11	5	10	9 4	0 8	7 2	10 5	11	11	6 4	0	1	2	1 8	3 10	4	5	4 11
6	10	4	11	5 0	6	11	10 5	1 9	8 3	11 6	0	0	7 5	1	2	3	2 9	4 11	5	6	5 0
7	11	5	0	6 1	7	0	11 6	2 10	9 4	0 7	1	1	8 6	2	3	4	3 10	5 0	6	7	6 1
8	0	6	1	7 2	8	1	0 7	3 11	10 5	1 8	2	2	9 7	3	4	5	4 11	6 1	7	8	7 2
9	1	7	2	8 3	9	2	1 8	4 0	11 6	2 9	3	3	10 8	4	5	6	5 0	7 2	8	9	8 3
10	2	8	3	9 4	10	3	2 9	5 1	0 7	3 10	4	4	11 9	5	6	7	6 1	8 3	9	10	9 4
11	3	9	4	10 5	11	4	3 10	6 2	1 8	4 11	5	5	0 10	6	7	8	7 2	9 4	10	11	10 5
0	4	10	5	11 6	0	5	4 11	7 3	2 9	5 0	6	6	1 11	7	8	9	8 3	10 5	11	0	11 6
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

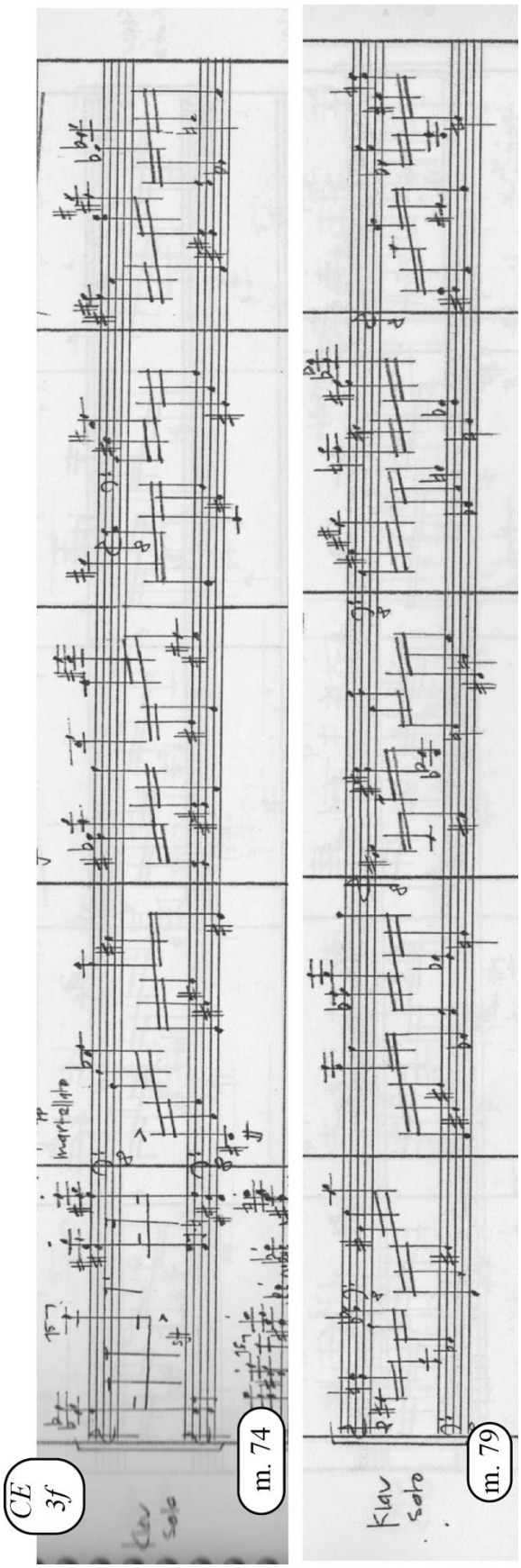


Figure 5.12: *CE 3f* in mm.74 – 83 of Beat Furrer's *Konzert für Klavier und Orchester*

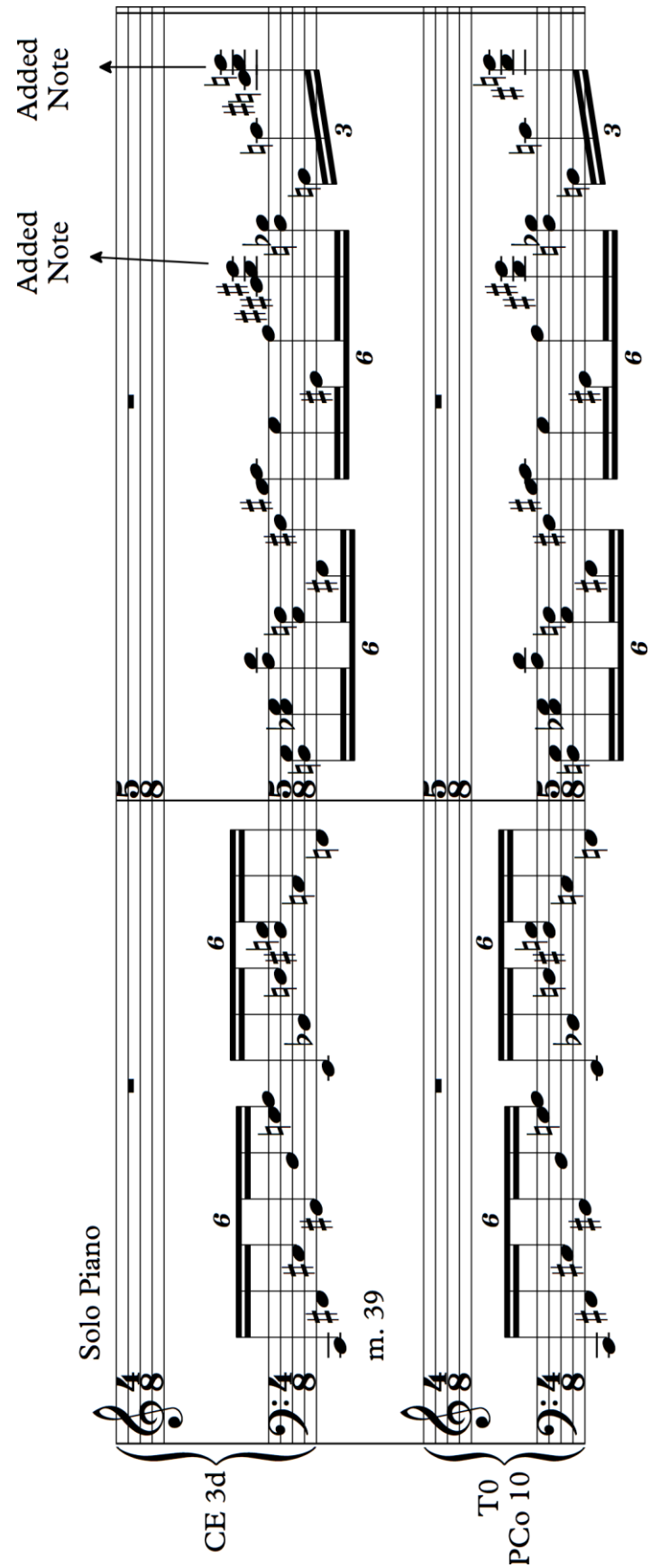


Figure 5.13: Added notes in *CE 3d* from Beat Furrer's *Konzert für Klavier und Orchester*

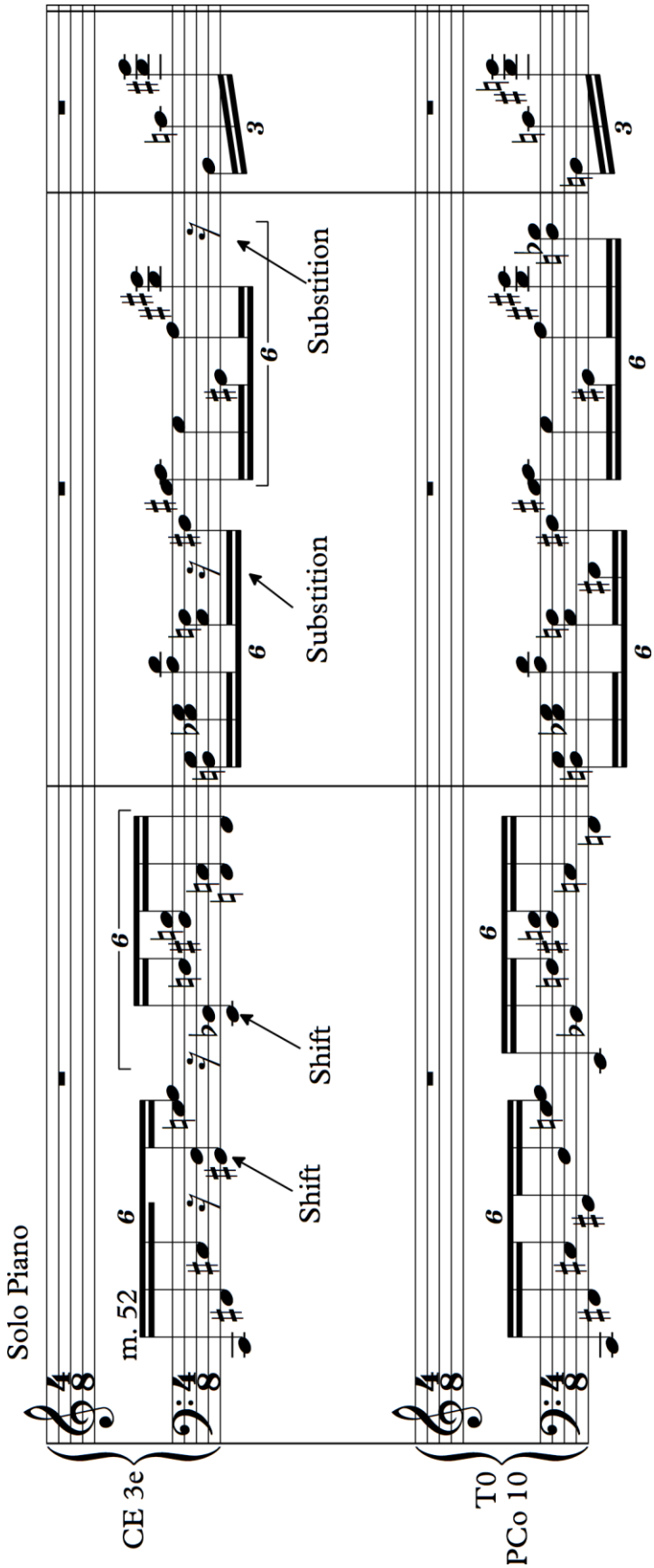


Figure 5.14: Note shifting and rest substitution in *CE 3e* from Beat Furrer's *Konzert für Klavier und Orchester*

CE 3c.....(continued to m. 31)

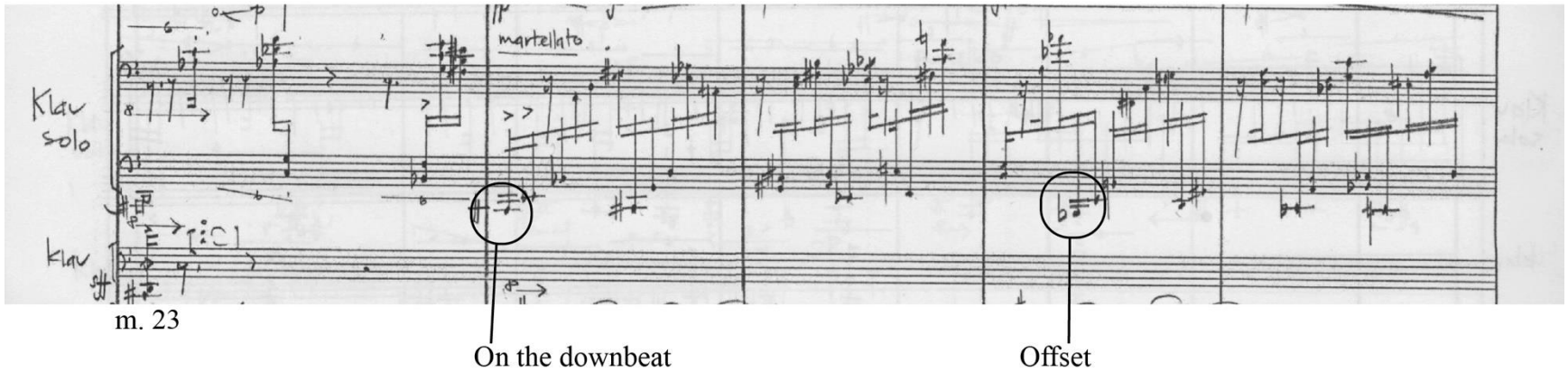


Figure 5.15: Offset in *CE 3c* from Beat Furrer's *Konzert für Klavier und Orchester*

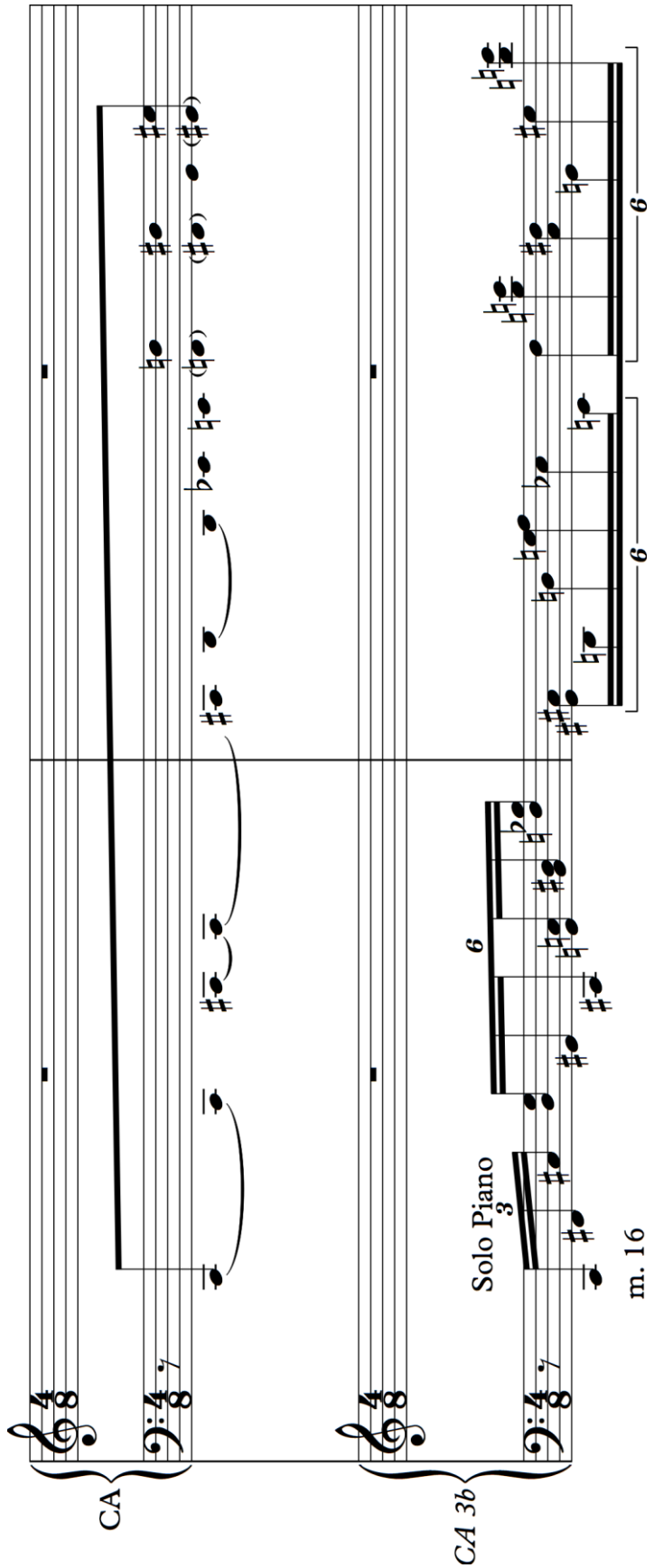


Figure 5.16: Secondary chromatic ascent in *CE 3b* from Beat Furrer's *Konzert für Klavier und Orchester*

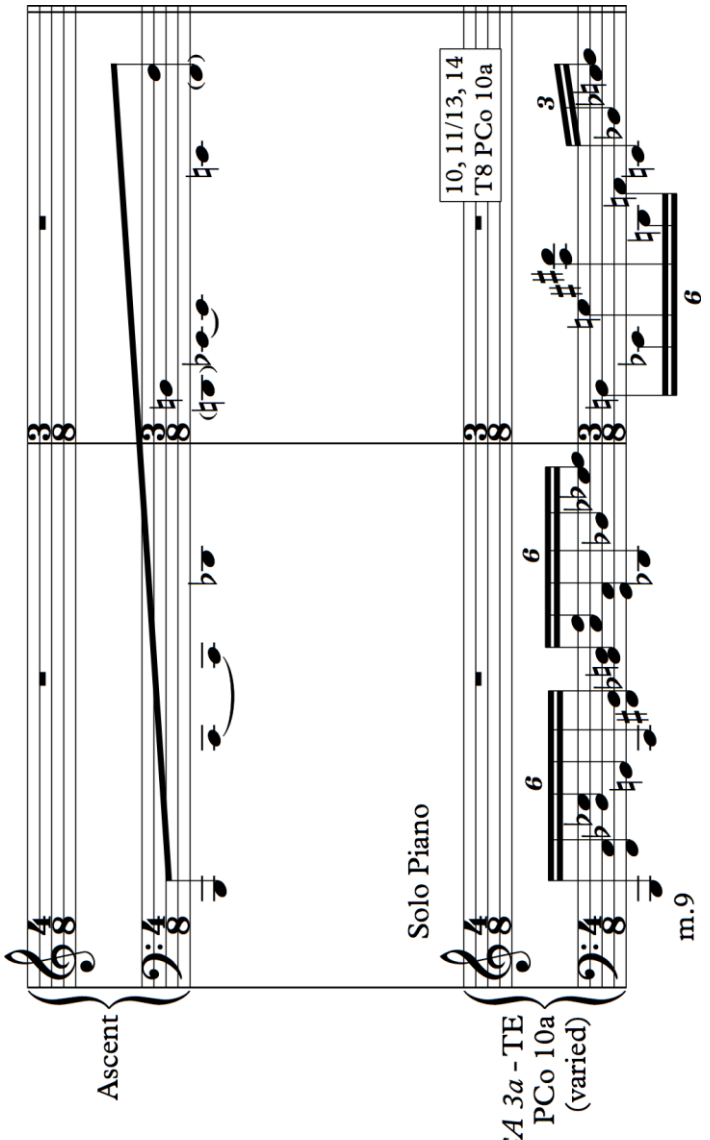


Figure 5.17: Secondary chromatic ascent in *CE 3a* from Beat Furrer's *Konzert für Klavier und Orchester*

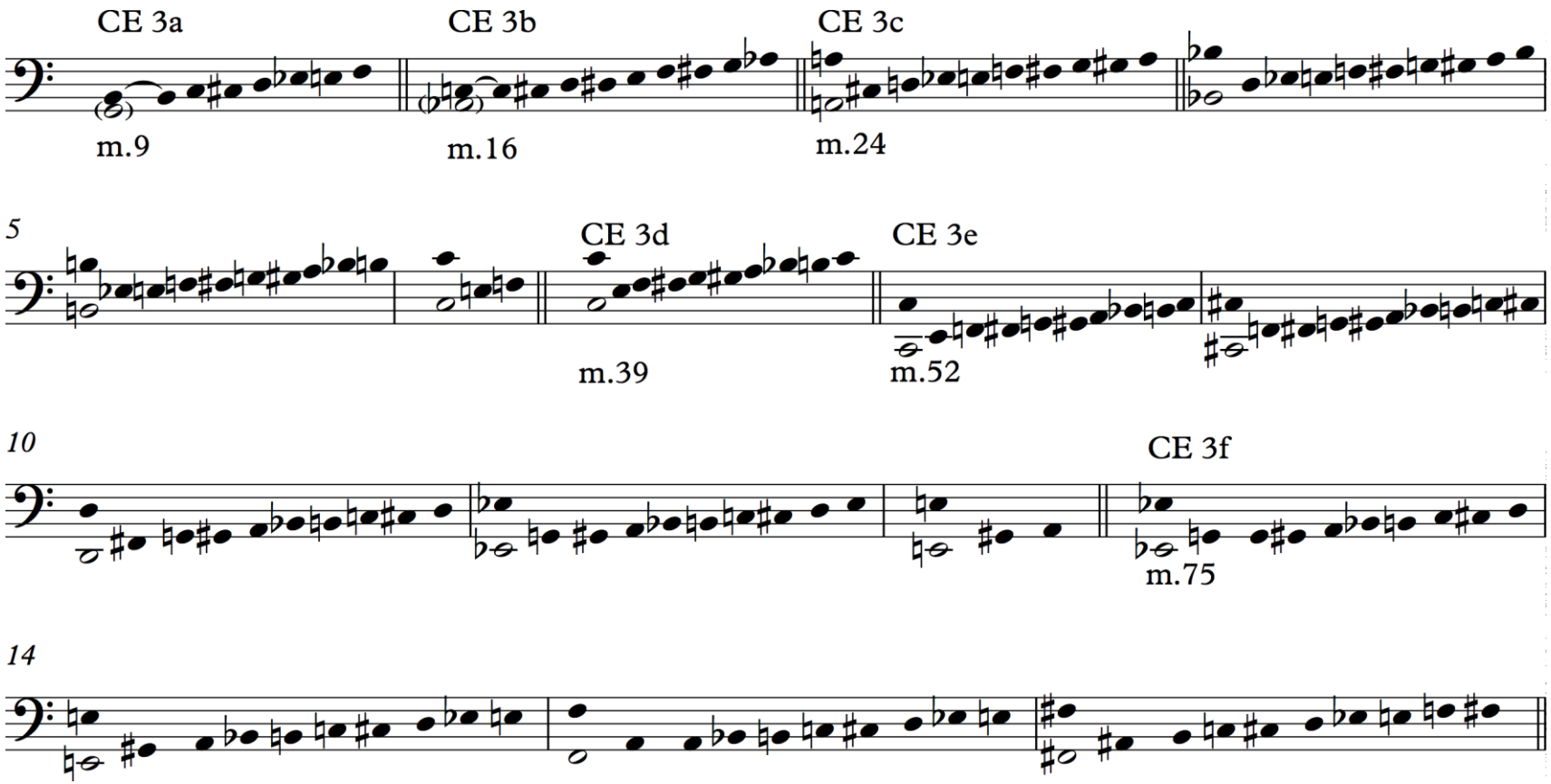


Figure 5.18: Chromatic ascent across all *CEG 3* events in Beat Furrer's *Konzert für Klavier und Orchester*

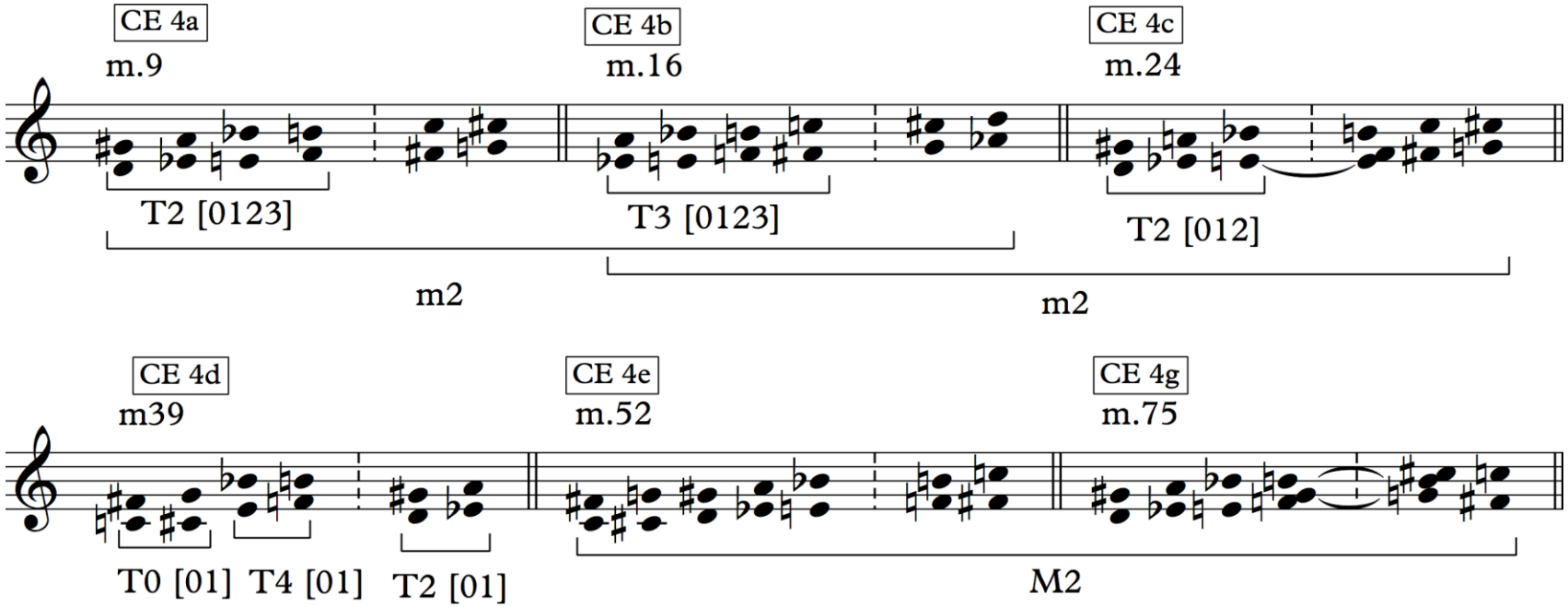


Figure 5.19: Reduction of the *CE 4a* sub-group in Beat Furrer's *Konzert für Klavier und Orchester*

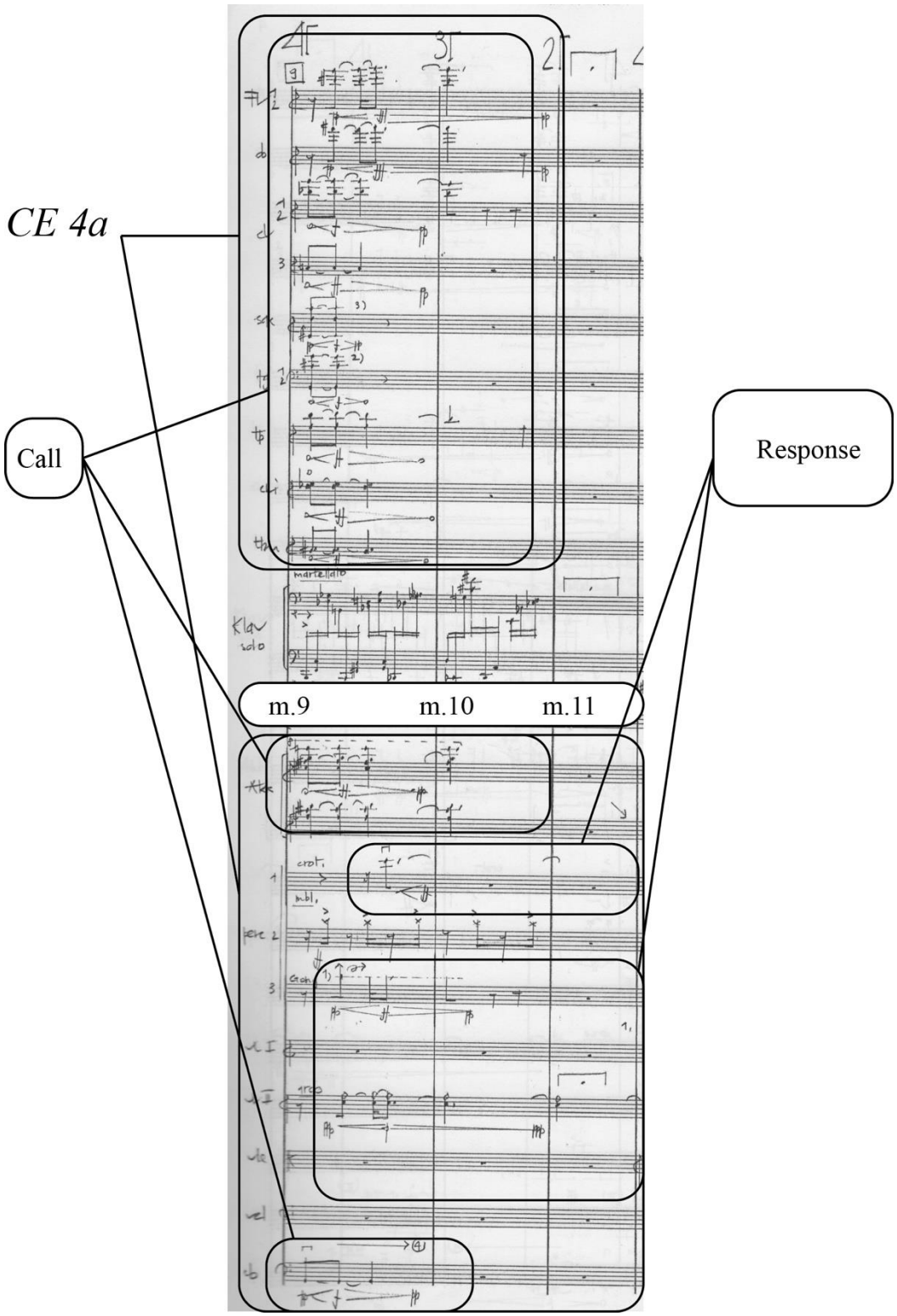


Figure 5.20: “Call and response” in the *CE 4a* sub-group in Beat Furrer’s *Konzert für Klavier und Orchester*

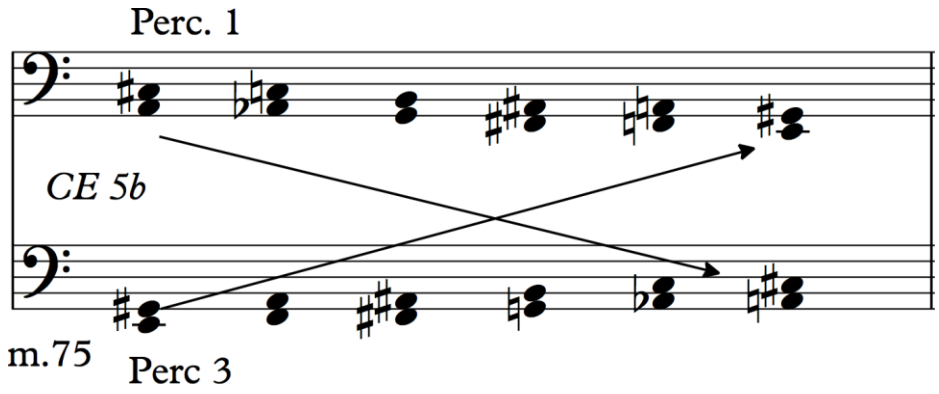


Figure 5.21: Voice exchange in *CE 5b* from Beat Furrer's *Konzert für Klavier und Orchester*

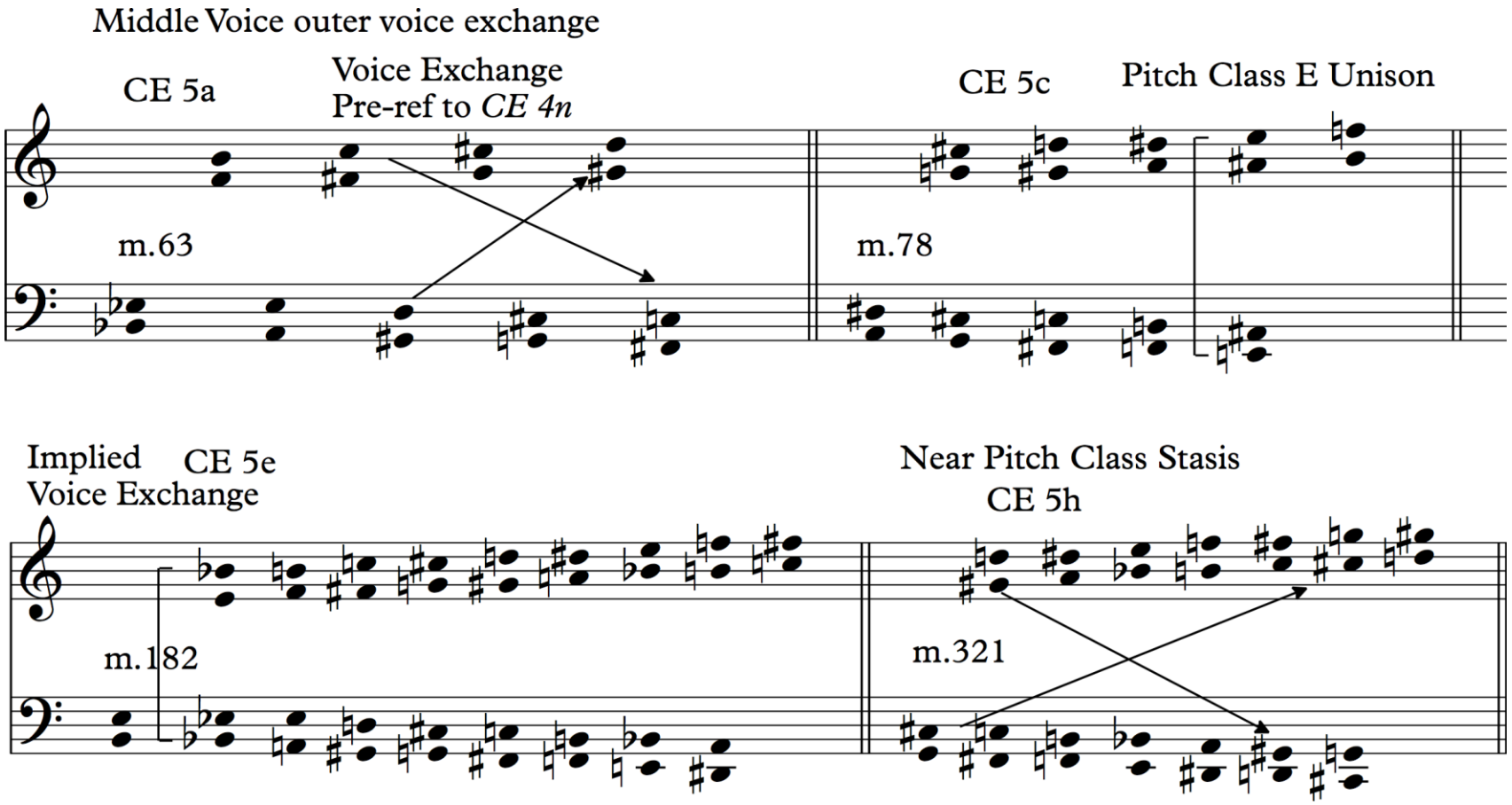


Figure 5.22: Reduction of the *CE 5a* sub-group from Beat Furrer's *Konzert für Klavier und Orchester*

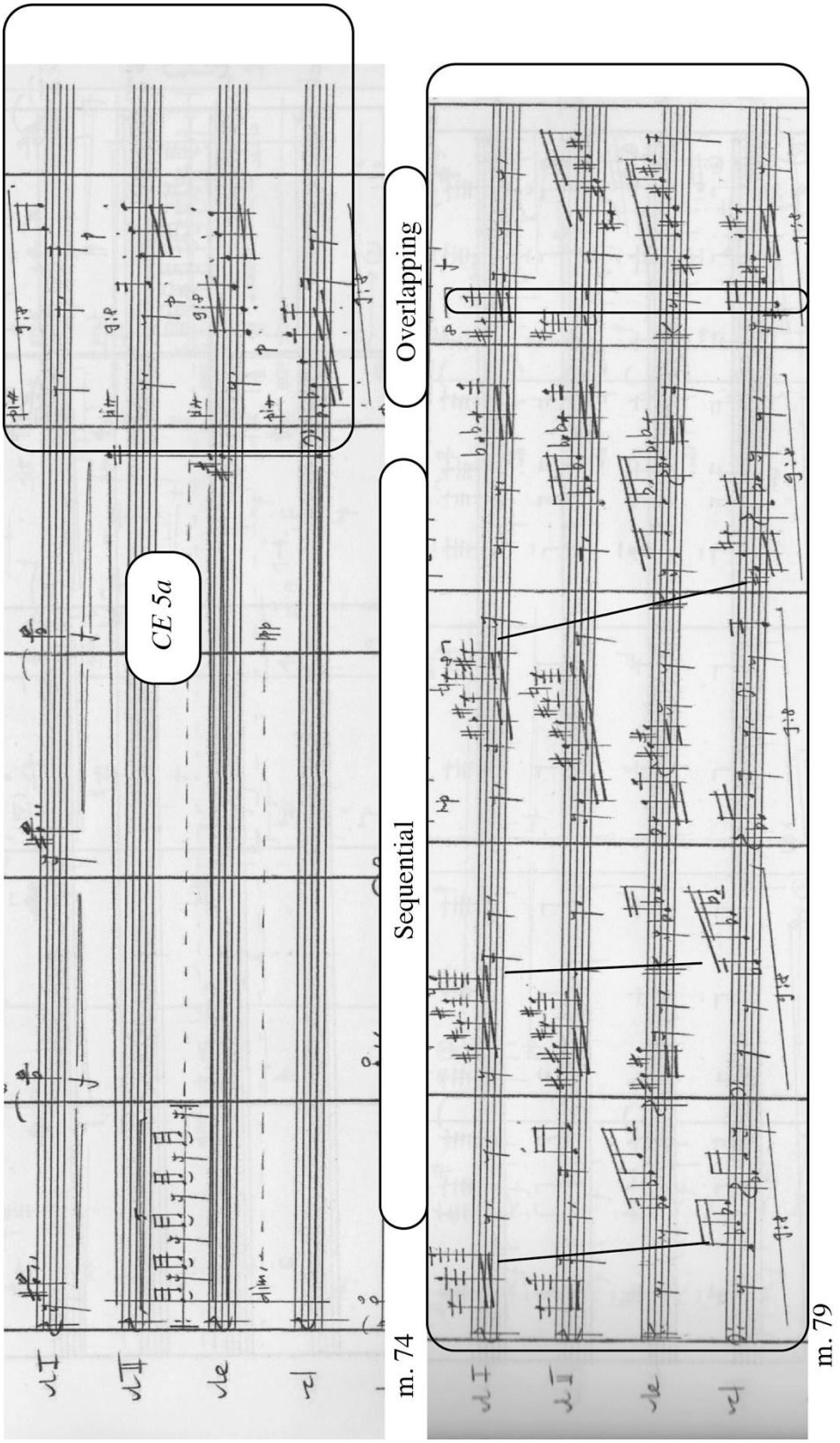


Figure 5.23: Rhythmic diminution resulting in overlap in *CE 5a* from Beat Furrer's *Konzert für Klavier und Orchester*

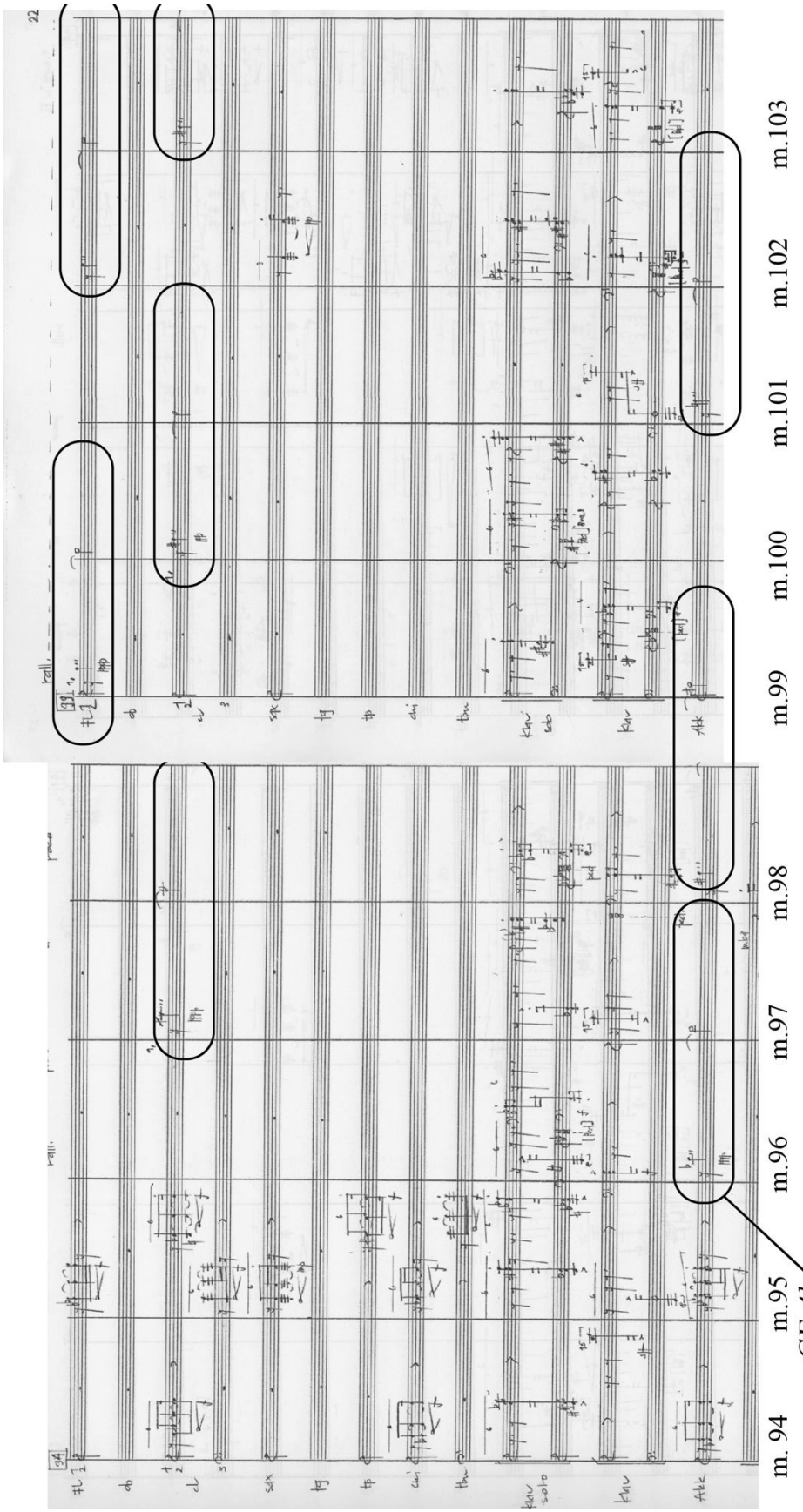


Figure 5.24: *CE 4h* in Beat Furrer's *Konzert für Klavier und Orchester*

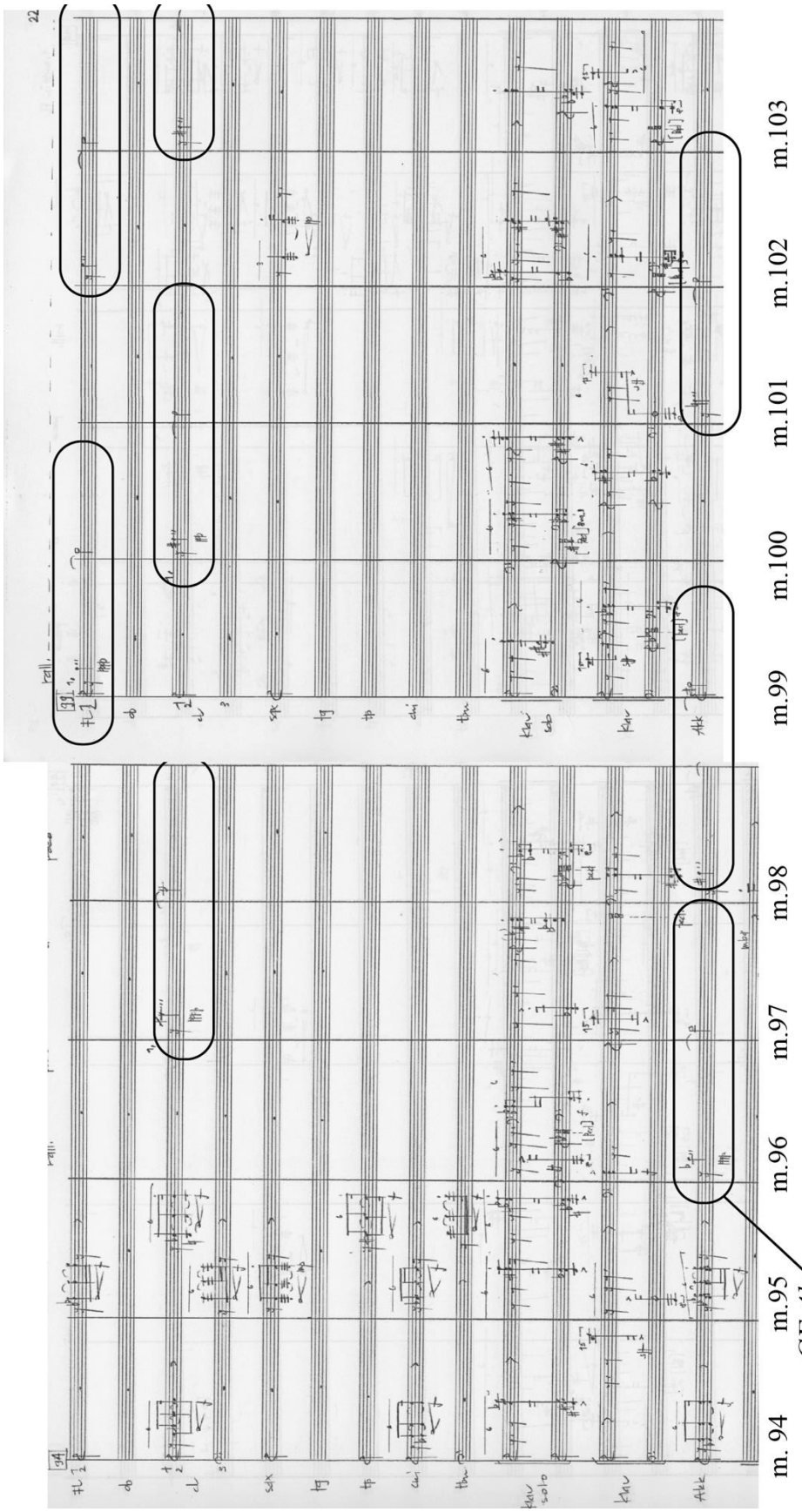


Figure 5.24 (continued)

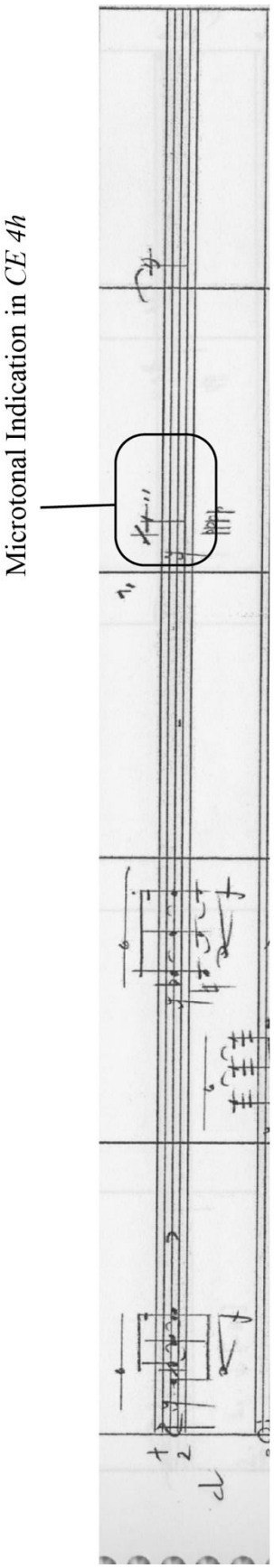


Figure 5.25: Microtonal indication in *CE 4h* in Beat Furrer's *Konzert für Klavier und Orchester*

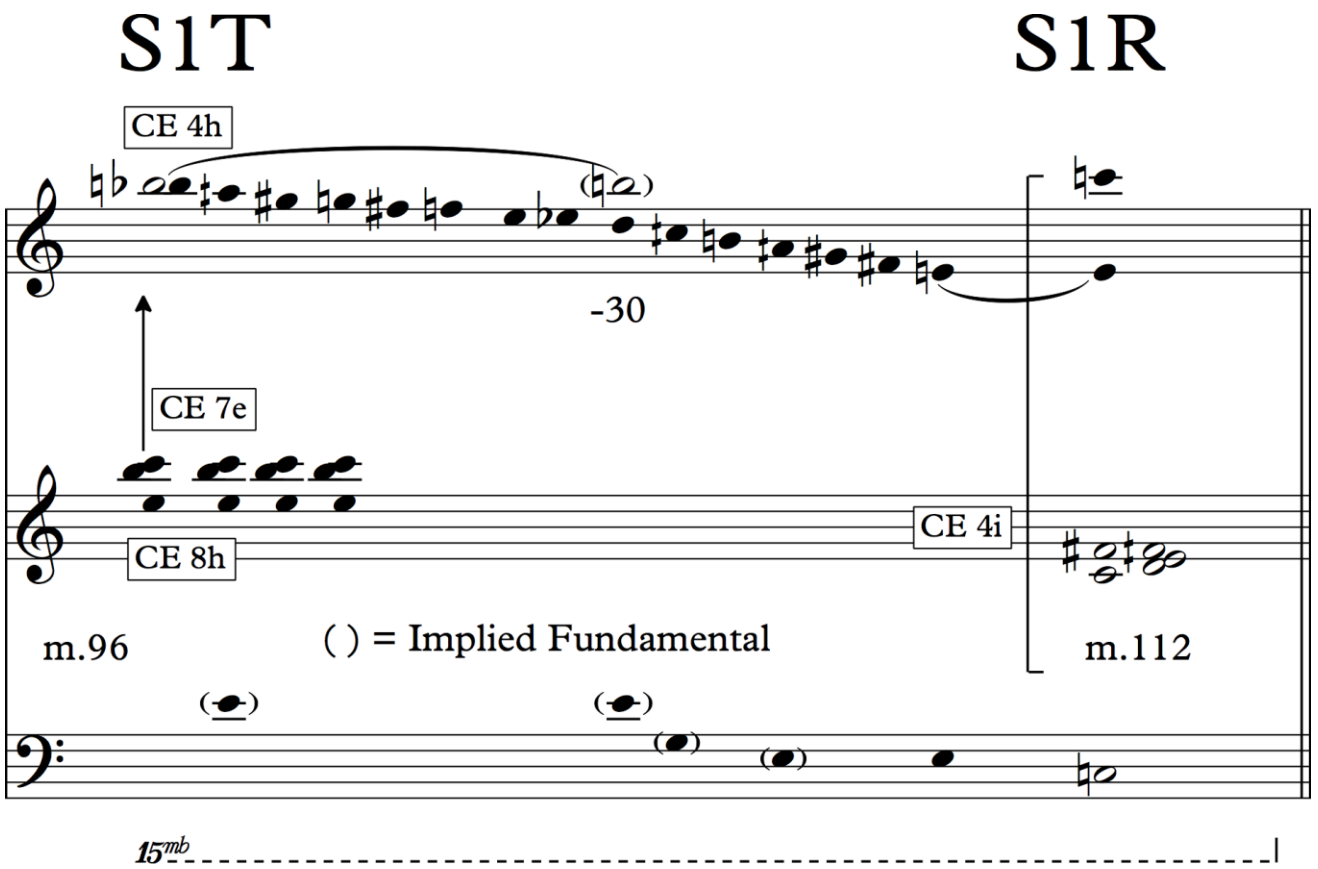


Figure 5.26: Reduction of *Section 1 Transition* and *Section 1 Response* in Beat Furrer's *Konzert für Klavier und Orchester*

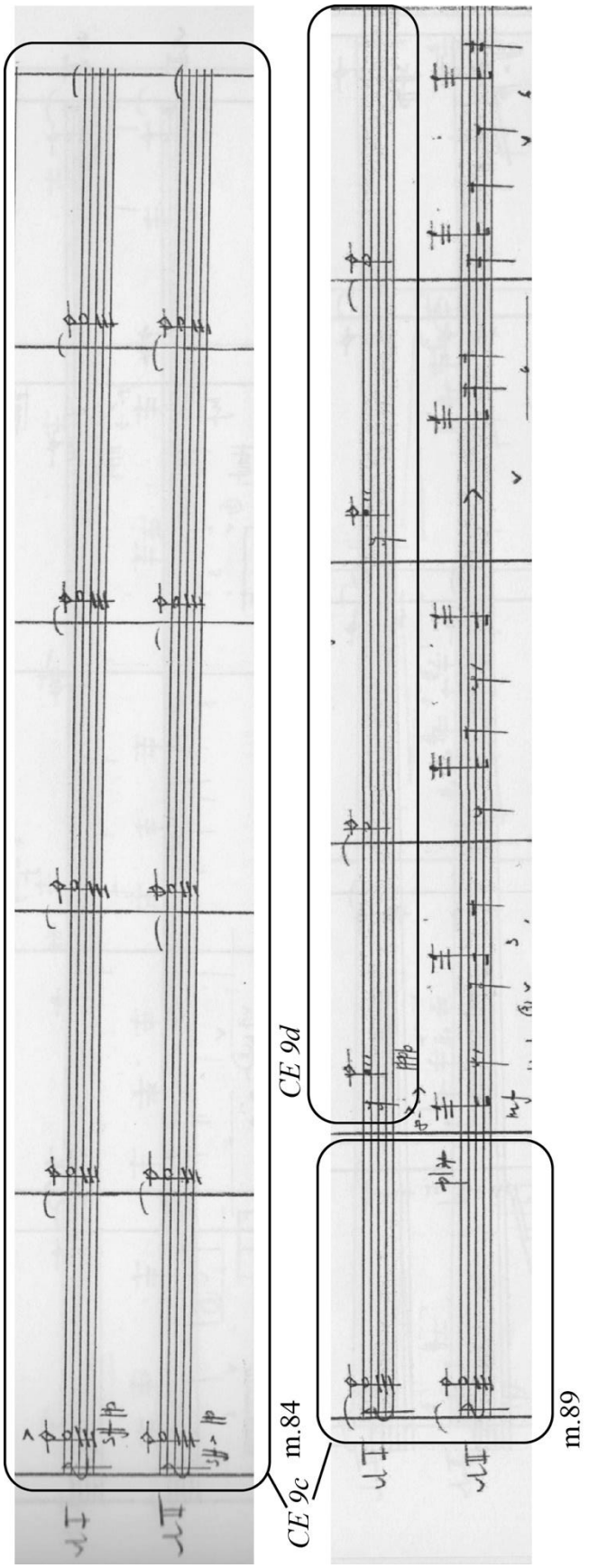


Figure 5.27: *CE 9c* in Beat Furrer's *Konzert für Klavier und Orchester*

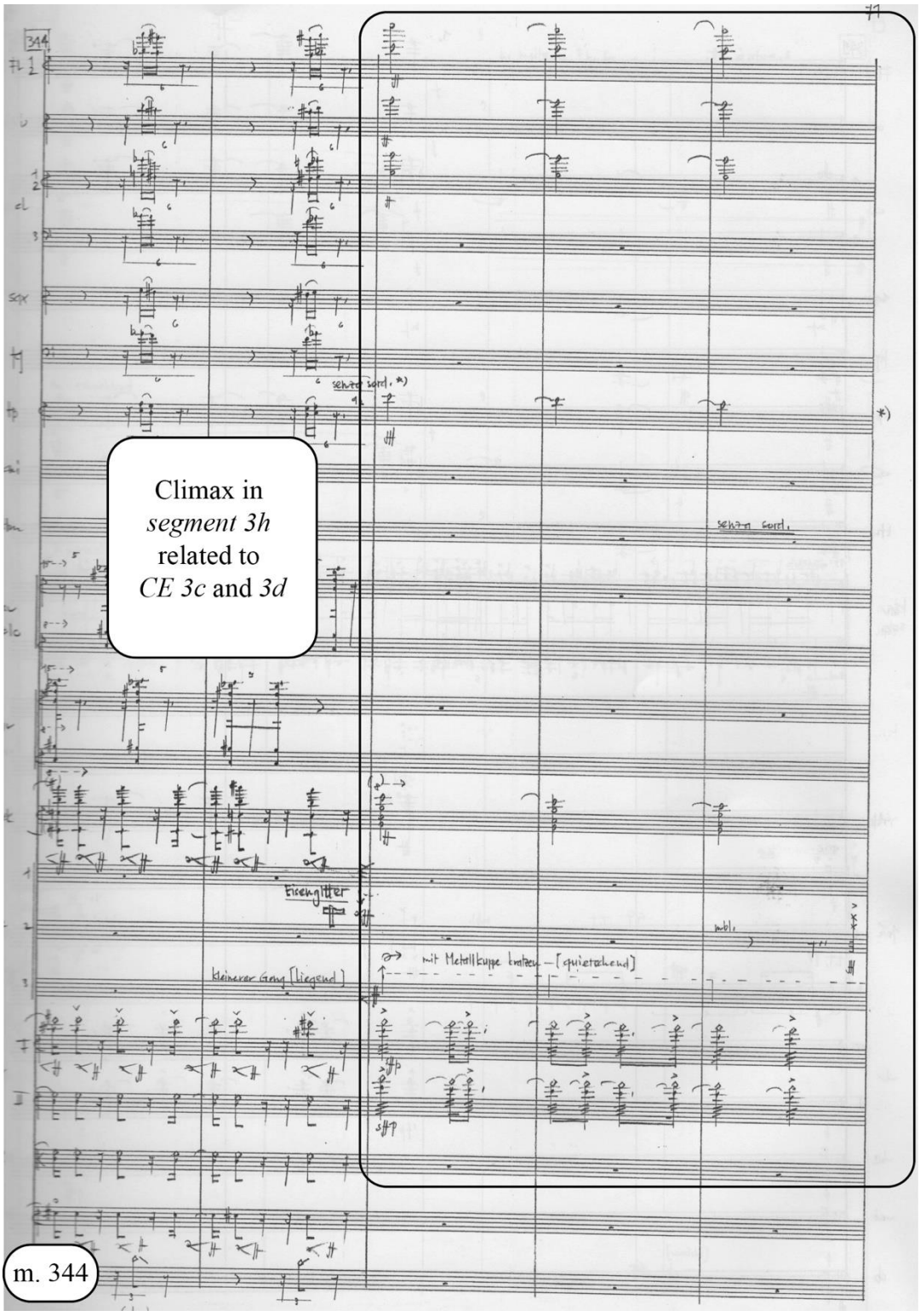


Figure 5.28: *Segment 3h* in Beat Furrer's *Konzert für Klavier und Orchester*

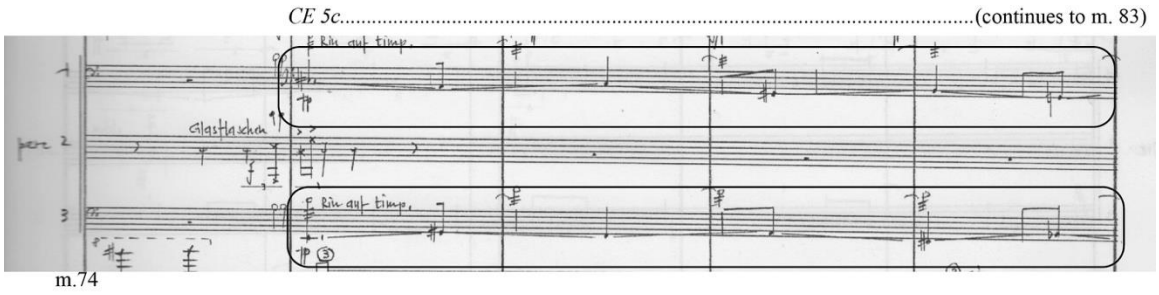


Figure 5.29: *CE 5c* in Beat Furrer's *Konzert für Klavier und Orchester*

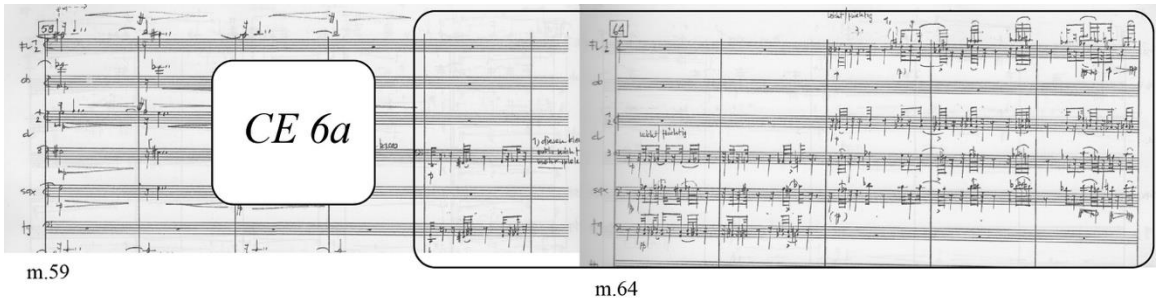


Figure 5.30: *CE 6a* in Beat Furrer's *Konzert für Klavier und Orchester*

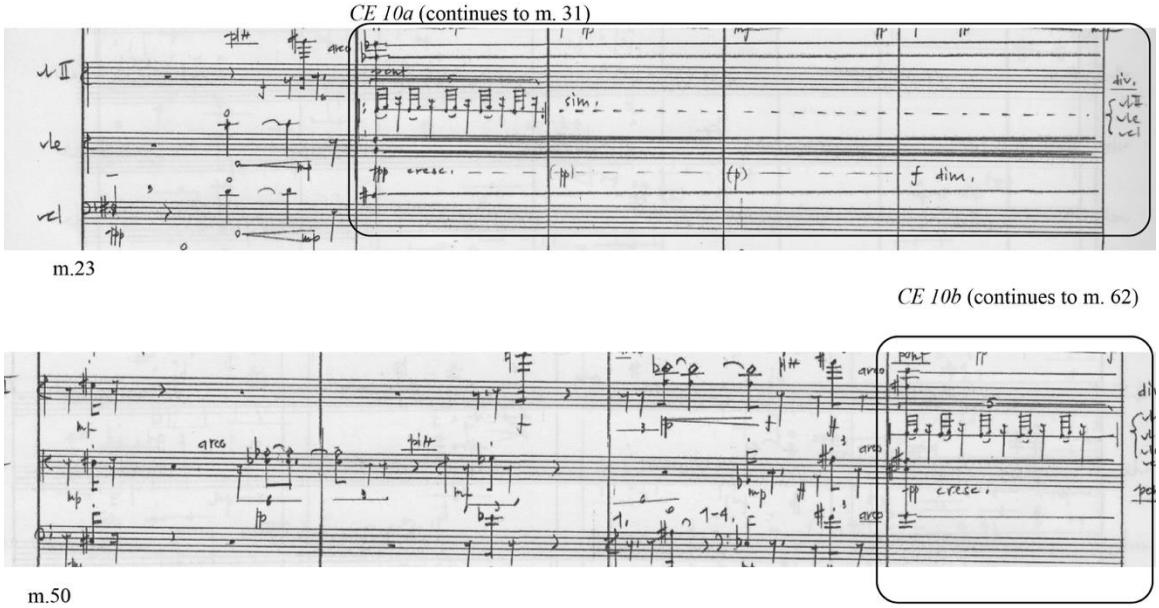
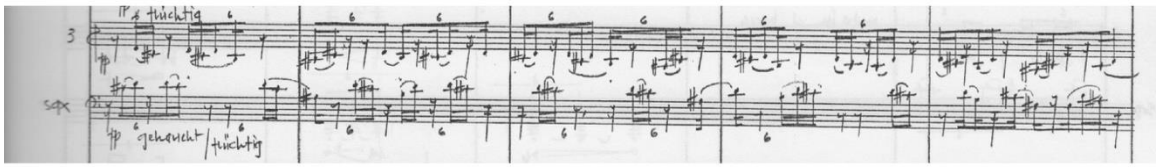


Figure 5.31: *CE 10a* and *10b* in Beat Furrer's *Konzert für Klavier und Orchester*

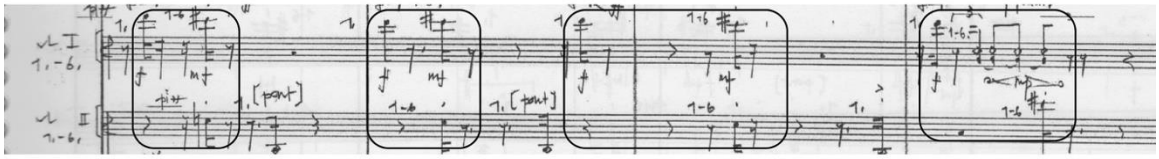
CE 10c (continues to m.89)



m. 84

Figure 5.32: *CE 10c* in Beat Furrer's *Konzert für Klavier und Orchester*

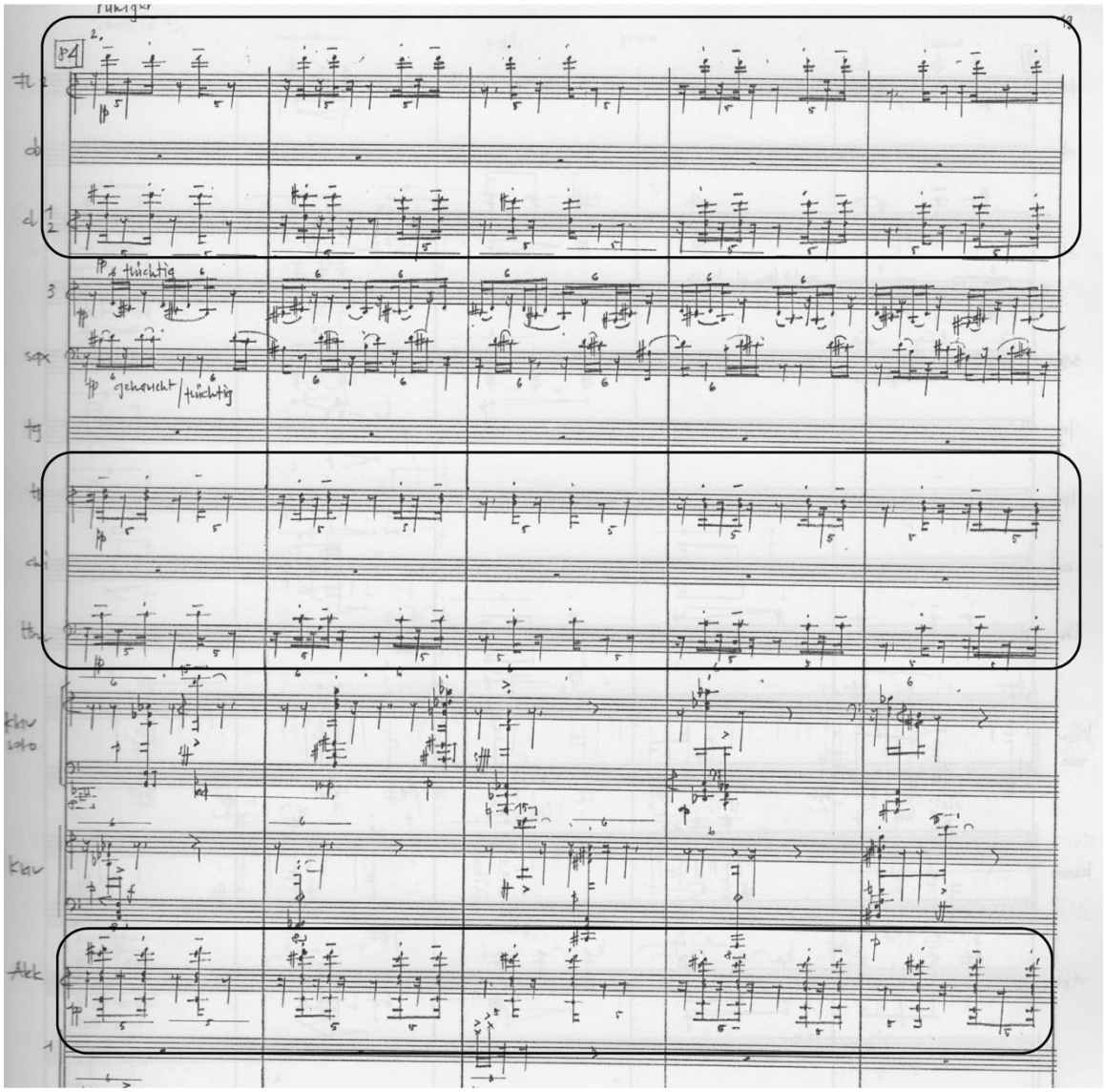
CE 8a



m.1

Figure 5.33: *CE 8a* in Beat Furrer's *Konzert für Klavier und Orchester*

CE 8f (continues to m. 89)



m.84

Figure 5.34: *CE 8f* in Beat Furrer's *Konzert für Klavier und Orchester*

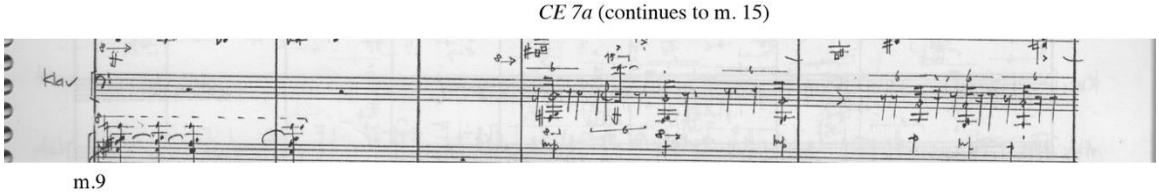


Figure 5.35: *CE 7a* in Beat Furrer's *Konzert für Klavier und Orchester*

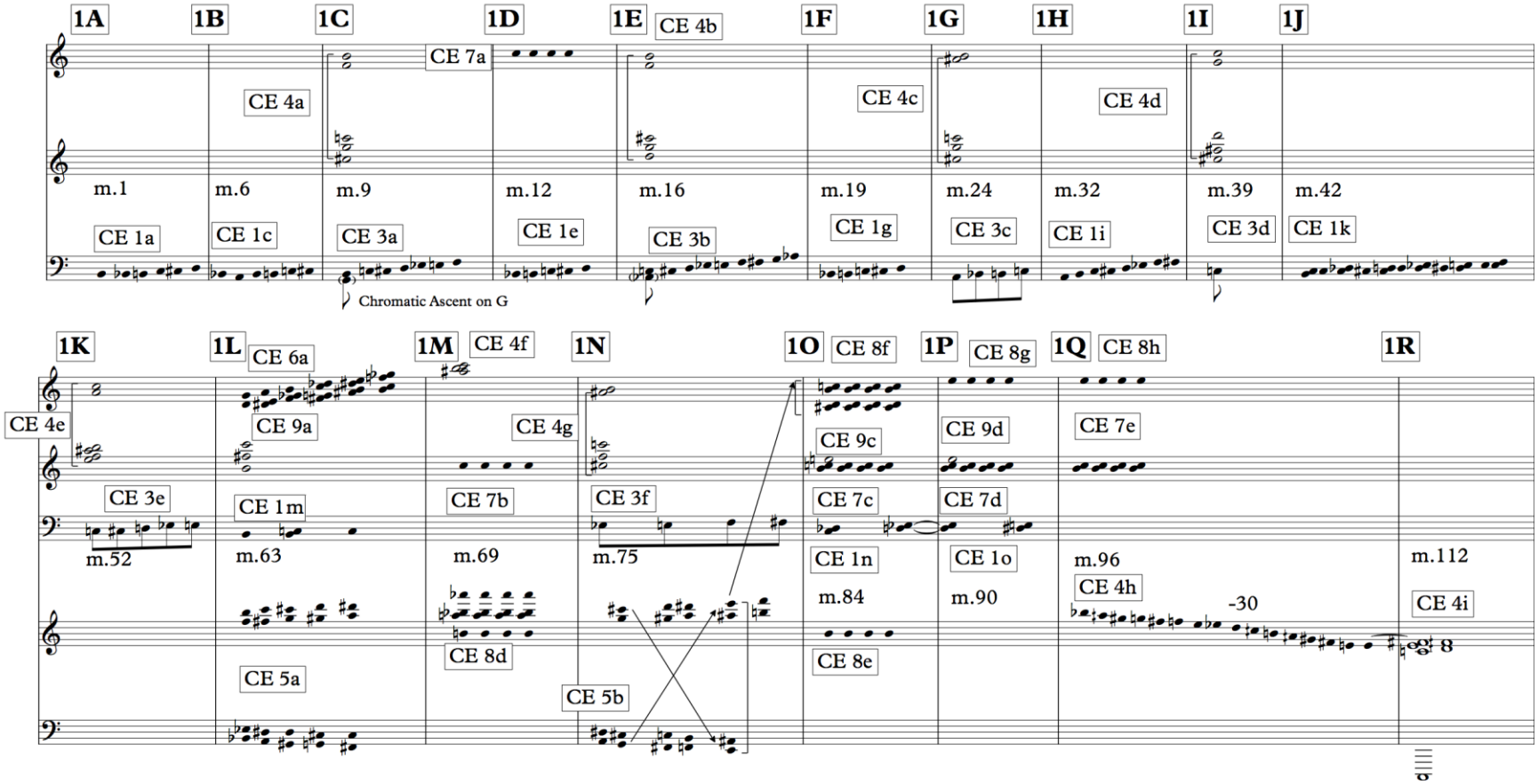


Figure 5.36: Reduction of *Section 1* of Beat Furrer's *Konzert für Klavier und Orchester*

CHAPTER 6

SEGMENT 2K AND *SEGMENT 3E*

Section 2 Call and *Section 3 Call* contain a number of similar *segments,* shown in Table 6.1. The climactic moments of *S2C* and *S3C* do not occur in similar *segments,* resulting in unique climaxes for *S2C* and *S3C* respectively, shown in Figure 6.1. These unique climactic moments could indicate that similar *segments* between *S1C* and *S2C* use similar *chromatic events* to fulfill different functions. An examination of *segment 2k* and *segment 3e* will show that in fact, *chromatic events* that comprise these *segments* are similar but transformed in order to realize the unique climactic moments of *S2C* and *S3C.* Like other *segments* in this concerto, *chromatic events* contained in *segment 2k* and *3e* consist of pedals, melodies, and countermelodies, many of which are variants of events discussed in previous chapters. Table 6.2 and 6.3 list all the *chromatic events* in *segments 2j – 2l* and *segments 3d – 3f.*

Chromatic Events Contained in *Segments 2k – 2l* and *3e – 3f*

Segment 2k contains the following *chromatic events*: *CE 4m*, *CE 5e*, *CE 5f*, *CE 6h*, *CE 6i*, *CE 6j*, and *CE 6k*. *Segment 2l* contains the following two *chromatic events*: *CE 6l* and *CE 4n*. Figure 6.2 shows the opening measures of the *chromatic events* in *segment 2k* and Figure 6.3 shows the opening measures of *segment 2l*.

Figure 6.4 shows that *segment 3e* contains:

- *CE 4r* – variant of *CE 4m*
- *CE 5h* – variant of *CE 5e*
- *CE 5i* – variant of *CE 5f*
- *CE 6t* – variant of *CE 6h*
- *CE 6u* – variant of *CE 6i*
- *CE 10r* – no analog in *segment 2k*

Segment 3f contains: *CE 6v, CE 6w, CE 6x, CE 8ag, CE 8ah, CE 8ai,* and *CE 9s*, shown in Figure 6.5.

S*egments 2l* and *3f* are not similar *segments* and do not contain related chromatic events. The collection of *chromatic events* that occur in *segments 2k, 2l, 3e,* and *3f* represents following *CE* sub-groups:[40]

- *CE 4m* sub-group: *CE 4m*, *CE 4n*, *CE 4o*, *CE 4p*, *CE 4q*, *CE 4r*, *CE 4s*[41]
- *CE 5a* sub-group: *CE 5a*, *CE 5c*, *CE 5e*, *CE 5h*[42]
- *CE 5b* sub-group: *CE 5b*, *CE 5d*, *CE 5f*, *CE 5g*, *CE 5i*[43]
- *CE 6h* sub-group: *CE 6h*, *CE 6i*, *CE 6t*, *CE 6u*[44]
- *CE 10a* sub-group: *CE 10a*, *CE 10b*, *CE 10g*, *CE 10m*, *CE 10o*, *CE 10r*[45]

[40] The entire contents of represented *CE* sub-groups are given here. Underlined *chromatic events* occur within *segments 2k, 2l, 3e,* and *3f.*
[41] Table 6.4
[42] Table 6.5
[43] Table 6.6
[44] Table 6.7
[45] Table 6.8

The *CE 6h* Sub-group

The *CE 6h* sub-group demonstrates a number of interesting features, especially regarding PCo 1, the most important ordered pitch collection in this composition.[46] All events in the *CE 6h* sub-group are comprised of fifteen-note thirty-second quintuplet ostinati, making them the sole *CEG 6* events that occur on the level of the thirty-second note quintuplet. All other *CEG 6* events occur as thirty-second notes. The solo piano performs the *CE 6h* sub-group events in rhythmic unison pairs: *CE 6h* and *6i* in *segment 2k* and *CE 6t* and *6u* in *segment 3e*. The left hand performs *CE 6h* and *6t* while the right hand performs *CE 6i* and *CE 6u.* When presented in *segment 2k*, the resulting gesture is varied with rest insertion, resulting in an eleven-measure gesture, shown in Figure 6.6. In *segment 3e*, rests are substituted rather than inserted resulting in three ascents that occur for three measures each, shown in Figure 6.7. In *segment 3e,* the three ascents are in rhythmic alignment with the ensemble music of *CE 4r*, shown in Figure 6.8. This is not the case in *segment 2k,* as there is no alignment of the bars with the ensemble music or the piano music, shown in Figure 6.9.[47]

CE 6h and *6t* use PCo 1 while *CE 6i* and *6u* use PCo 5. Since *CE 6t* and *CE 6u* are aligned with the bar, they are used as examples throughout this section, unless otherwise noted. Figure 6.10 demonstrates that *CE 6t* and *6u* are generated by transposing their respective ordered pitch collections up by minor seconds over the course of *segment 3e*. The transposition occurs when the ostinati repeat. One slight

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[46] Table 6.9 provides complete transpositions for PCo 1.

[47] Further amplifying rhythmic asynchronicity, the ascents in *segment 2k* hand off to *CE 6l*, a fairly straightforward presentation of a fifteen thirty-second note Pco 1 ostinato transposed upwards by semitone in both hands of the solo piano in *segment 2l,* resulting in two three measure range ascents synchronized with *CE 4n*. Since this event occurs at the thirty-second note level rather than the thirty-second note quintuplet level, the ostinati and transposition of them begin to phase with the meter of the composition while the range ascent moves with it, resulting in a range peak out of synch with the pitch transposition.

modification is made to *6i* and *6u* in order to avoid parallelism and increase the playability of the part. A foreign note is inserted as the second note of the first left hand ostinato of each of the three ascents, shown in Figure 6.10. This foreign note allows for the left hand and right hand to begin on the same pitch class, but transpositions that follow are offset by one thirty-second note quintuplet.

Figure 6.10 also demonstrates that major third symmetrical construction of the chromatic scale is emphasized in *CE 6t* and *CE 6u*. The three larger ascents of *CE 6t* and *6u* on begin on pitch class C, E, and Ab, which accentuates symmetric major thirds within chromatic ascent. Also, the pitch collection that generates *CE 6t*, PCo 1, exhibits a loose symmetrical division by the major third and the tritone, shown in Figure 6.11. Therefore, nesting of symmetric thirds is present between the larger three-measure gesture and the pitch collection used in *CE 6t*. Another way of thinking of this would be to parse PCo 1 into three collections, related by major thirds, or two collections related by a tritone. Since the full nine-measure piano gesture consists of PCo 1 transposed by major thirds, nesting of major third transpositions between the *segment*-long gesture and PCo 1 is clearly present. Additionally, the slow moving thirds mentioned above, C, E, and Ab, are filled in by repetitions of PCo 1, transposed by minor seconds. All of these symmetrical ascents are moving at different, but related rates of speed, shown in Figure 6.12.

It is also worth exploring the connection between *CE 6t* and *CE6t*, as it clearly demonstrates convergent and divergent similar motion. Figure 6.13 shows reductions of the two pitch collections without rests, placed in a similar register for comparison. Notice the intervallic contraction of the lower voice up to the upper voice. Figure 6.14

extracts the widest and narrowest moments between the hands, omitting the added note in the first ostinato for demonstration. This reduction clearly demonstrates intervallic contraction and similar motion.

One can clearly see in Figure 6.14 that the lower voice begins by converging into the upper voice from a major second, passes through the pitch class of the upper voice, turns divergent, then convergent again until arriving a major second lower than the upper voice. The lower voice then leaps down a linear tritone, resulting in a divergent perfect fifth between the voices. *CE 6u* then ascends up through the tritone interval class and becomes convergent again, then finally arrives on pitch class A – ending up a major second lower than the upper voice. Figure 6.15 demonstrates this convergent and divergent journey by transposing the upper voice to a pitch class C pedal. The lower voice is then transposed by the same amount of semitones that resulted in the upper voice reaching C. This transformation effectively turns parallel convergent and divergent motion into oblique convergent and divergent motion which illustrates that the lower voice passes through C at different points. Therefore, while the actual convergence between the left hand and right hand solo piano ascents shows one form of contraction, Figure 6.15 shows that two full cycles of interval class convergence and divergence occur within for every three cycles of the ostinato. These two interval class cycles imply six complete chromatic ascents between the left hand and right hand as they ascend.

Other *CEG 6 Chromatic Events*

Segments 2k and *3e* contain a number of *CEG 6* events, so while not all *chromatic events* discussed in the following section are used in these *segments,* the information

presented will allow for a better understanding of how *CEG 6* functions throughout the composition. *CEG 6* events are predominantly presented in the winds and strings with the exception of the *CE 6h* sub-group and *CE 6p*. *CE 6p* uses brass to help realize the climax of *S2C*. Most *CEG 6* events consist of thirty-second note ostinati transposed by the ascending chromatic scale, similar to *CE 6d*. The simplest form of transpositions occurs when the ostinato repeats, but in some instances, the transposition occurs at the beginning of a measure, regardless of where the ostinato is in its pattern. Variation by measure demonstrates that the metric pacing of the piece has an effect on the generation of the material, asserting that the time-span of a measure is a local formal determinant. Therefore, meter is something that can be offset agains, despite the lack of any clear metrical pattern.

The process for identifying *CEG 6* events is fairly tedious. It involves comparing multiple varied ostinati to each other in order to derive an original ordered pitch collection. Then, the unvaried ostinato is generated, transposed, and compared to the score to confirm the results, demonstrated in Figure 6.16, the bassoon part of *CE 6j*. When a number of *CEG 6* events are analyzed in this fashion, it can be shown that many of the pitch collections used in *CEG 6* consist of PCo 1 directly, or a variant of it, illustrating an ordered pitch class connection between the solo piano and the ensemble.

In addition to variations mentioned above, *CE 6j* shows three additional variations are possible for *CEG 6* events: restarting, transposing by measure, and switching pitch collections. Figure 6.17 contains the bass clarinet voice of *CE 6j* from *segment 2k*. In measure 203, *CE 6j* music is transformed using all of these processes at once: the ostinato is transposed, despite the fact it is the middle of a pattern, the pitch

collection changes from PCo 6 to PCo 7, and the ostinato restarts on the first beat of the measure.[48] While only the bass clarinet is given in this example, similar compositional techniques are used to generate the material for all the instruments involved in *CE 6j*.

While *CE 6j* is a highly varied *chromatic event* that provides pitch class variation for *segment 3e*, *CE 6r* represents the least varied *chromatic event* in *CEG 6*, shown in Figure 6.18. *CE 6r* functions as an ascending ostinato pedal that occurs in the flute and first and second clarinet parts. This event is generated from a seventeen thirty-second note PCo 8 ostinato varied by rest substitution.[49] The rest substitution in the flute voice is unique from the two clarinets, resulting in a slightly varied harmonization that contributes to blurring the exacting periodicity of the ostinati. Furrer also indicates that these gestures area to be performed "*breathy",* further obscuring their pitch.[50] [51] In terms of ordered pitch collections, PCo 8 is very similar to PCo 1. PCo8 contains an extra pitch class D inserted between notes five and six of PCo 1 and the first note of T1 PCo 1 is appended to T0 PCo 1. These note additions transform PCo 1 from a fifteen-note pitch collection to a seventeen-note pitch collection.

In *CE 6r*, the ostinati begin on pitch class C in the flute and D and G in the clarinets, resulting in a pitch class [027] trichord, shown in Figure 6.19. This quartal harmony is scored in such a way that slightly privileges outer voices, C4 and G5, resulting in an important arrival for the chromatic framework of *S2C*. These ostinati are planed in parallel without transposition, allowing them to function as a pedal that rises

[48] Table 6.10 and Table 6.11 list the pitch collections and transpositions for PCo 6 and 7.
[49] Table 6.12 lists the pitch collections and transpositions for PCo 8.
[50] Beat Furrer *Konzer für Klavier und Orchester* p. 49
[51] Obscuring literal process is core to this composition; without obscurity and other important musical variation, the piece could sputter under the limitations of the material chosen and the processes used to generate them.

then aborts further ascent by leaping back to its original pitch as if it were unable, for an unknown reason, to rise past a certain limit. This gesture is a crippled, rigid loop, that phases against the meter of the composition, resulting in rhythmically offset repeats.

While *6r* represents the least varied *CEG 6* event, other considerably more varied events like *CE 6v, 6w,* and *6x* provide different functions inside *segment 3e.* Unlike *6r*, all ostianti in these *chromatic events* are transposed. Figure 6.20 demonstrates the transpositional framework used to generate the material for *CE 6v, 6w,* and *CE 6x*. In some cases, transposition occurs when the ostinato repeats and in other cases, it occurs simply at the beginning of a measure. Measure 332 in the 'cello part of *CE 6w* shows an excellent example of transposition by measure as T6 PCo 9 occurs rather than the expected T4 PCo 9. This unexpected transposition occurs despite the fact that the 'cello part is in the middle of its ostinato and serves to converge the lowest voice of *CE 6w* from a T8 [026] trichord to a T8 [024] trichord.[52] [53] This [024] trichord is again varied by nonsequential transposition at the bar in measure 334, resulting in a TT [017] in open scoring. So, unexpected transposition of ostinato at the measure provides harmonic variation between the ostinato. After measure 334, *CE 6w* simply planes upwards in major seconds for the remainder of *segment 3e*.

CE 6v begins *segment 3e* as a T6 [0156] tetrachord planing upwards in minor seconds, but at 334, another voice enters while another drops out, resulting in a T3 [0156] tetrachord. A fifth voice is definitively added to the texture in measure 336, further

[52] *CE 6w* consists of PCo 9 transposed by major second. Table 6.13 lists the pitch collections and transpositions for PCo 9.

[53] A similar process most likely occurs in measure 331 as all three parts are transposed further than the major second pattern that is established in the first measure. The varied transposition changes the sonority from an T0 [047] trichord to a T6 [026] trichord, but this cannot be demonstrated fully, as some notes have been substituted with rests.

thickening the harmonic structure. *CE 6x,* which enters in measure 338, can be viewed as a voice addition to *CE 6v* as *CE 6x* contains the same pitch collection as *CE 6v* and transposes at the same time *CE 6v* does. The vertical result of the six-voice combined texture of *CE 6x* and *CE 6v* contains two [012] trichords harmonized at the tritone. These tritones continue planing up minor seconds in parallel for the remainder of *segment 3e*.

CEG 6 events that occur in *segments 2k, 2l,* and *3f* are varied by the techniques described above. *CE 6r* is the only *CEG 6* event that does not transpose. All other *CEG 6* events contain a literal ascent by major or minor second, or an ascent varied by convergence. The wide range of variation of these *chromatic events* allows for *CEG 6* events to fulfill different functions. For instance, *CE 6r* provides an unstable rising pedal structure that contributes to the transitional function of *S2T*. *CE 6j* is highly varied and contributes an abstract ascent that provides forward motion through *segment 2k*. Finally, the *CEG 6* events connect the ordered collection, PCo 1, to the solo piano events, the *CE 6h* sub-group. Sharing elements of an ordered collection unifies the ensemble and the solo piano.

The *CE 5a* and *5b* sub-groups

The *CE 5b* sub-group was discussed regarding voice exchange in Chapter 5 and is discussed here in the context of severe masking. A masked *chromatic event* is covered by surrounding musical texture or somehow obscures itself, like *CE 1n* and *CE 1o*. The *CE 5b* sub-groups falls into the second category while the *CE 5a* sub-group falls into the first. Since the *CE 5b* sub-group is the least varied sub-group in this composition, *CE 5f* and *5i* are the least varied similar events contained in *segment 2k* and *3e*. *CE 5f* begins

after one measure of rest and continues for one measure longer than *CE 5i*, filling up eleven measures in *segment 2k* opposed to nine measures in *segment 3e*.[54] The measures of rest are the only differences between the *CE 5f* and *CE 5i*.

All of the events in the *CE 5b* sub-group do not sound as written in the score; they are highly obscured. *CE 5f* requires the second percussion part place a *rin*, a Japanese singing bowl, onto a single timpano, presumably a 29" drum. The score indicates to roll on the *rin* until measure 192. While rolling on the *rin*, the player uses the pedal on the timpani to glissando to specific pitches outlining chromatic thirds starting on E2. The rhythm of the glissando outlines a 4:3 metrical hemiola, pre-referential to the synchronized solo piano ascent in *segment 3e*. The notation of this event gives the impression that ascending chromatic thirds would clearly project with this gesture, but in fact, the chromatic ascent is quite obscured. Sympathetic resonance of a timpano is acoustically subservient to the roll on the *rin*, so despite the direct projection of the scale, the result of *CE 5f* is that of a sounding *rin* pedal shadowed by a ghost image of the chromatic scale moving obliquely against it.

CE 5e and *5h* are part of the *CE 5a* sub-group and are highly obscured by the *chromatic events* that surround them. Despite the masking, both events play important roles in the chromatic framework since they project clear, measured chromatic ascents and descents moving in contrary motion. For instance, *CE 5e* provides a chromatic descent connecting to *CE 4n* and *CE 5h* ascends to the articulated pedal of *CE 8aj*, shown in Figure 6.21. Since all of the *CEG 5* events are highly masked, and are the clearest

[54] Usually, the one measure of silence could indicate offset, but in this case, there may be another explanation. This gesture, scored from E2 – D3, completely exhausts the range of one timpano. In fact, it is difficult to even coerce a 29" drum to hold a convincing E2 with a top D3; F2 to D3 is much more comfortable. Starting a measure earlier would require more pitches than the drum could play.

presentations of chromatic ascent and descent in the concerto, the ensemble *never* presents an overtly discernable long-scale linear chromatic ascent or descent during the concerto.

Therefore, masking these ascents and descents represents an irreverent take on the subservience of the ensemble to a soloist in a concerto. Deliberately obscuring the ensemble presentations of chromatic ascent or descent and overtly projecting them in the solo piano adds to the binary opposition of the solo piano and the ensemble.

The *CE 4m* Sub-group

The *CE 4m* sub-group is an essential force for moving central pitch classes upwards and downwards from *segment* to *segment* in *Section 2 Call* and *Section 3 Call*. C*hromatic events* contained in the *CE 4m* sub-group utilize chromatic connections of which defines *CEG 2*, outlined in Chapter 5. As shown before, the *CE 4m* sub-group contains the following events: *CE 4m, 4n, 4o, 4p, 4q,* and *4r*.

CE 4m is comprised of three chords connected by minor seconds in at least one voice, reduced in Figure 6.22. The core sonority consists of a T3 [017] trichord that ascends by minor seconds. The B5 in the flute functions as an anticipation to pitch class B in the second chord, emphasizing convergent motion to B.

Figure 6.23 demonstrates that *CE 4n* and its fanfare variants, *CE 4p* and *4q,* function similar to *4m,* but instead of planing, the voices begin with a T1 [016] trichord and move in contrary motion. Voice exchange occurs immediately between outer voices of *CE 4n,* highlighting pitch descent concurrent with pitch ascent. This contrary motion results in intervallic expansion by major second, and will only result in the following

interval pattern between the outer voices: P4, P5, M6, M7, m2, m3, (P4) which demonstrates a generative aspect of the relationship between major seconds and minor seconds: major second relationships can occur from chromatic lines in contrary motion. *CE 4p* continues the ascent and descent of *CE 4n*, demonstrating a chromatic ascent between *segment 2l* and *2p* which are separated by *segments 2m, 2n,* and *2o*. The lower voice moves from pitch class C to B and the upper voice moves from A to Bb. *CE 4n* and *CE 4p* result in a T7 {0123} ascent and TE {0123} descent, which is yet another manifestation of major third symmetrical construction of the chromatic scale.

Segment 3a material is similar to *segment 2p* varied and performed backwards, starting high and ending low. *CE 4q* does begin with high notes, giving the sense of moving in reverse in terms of overall gesture, but does not move in reverse in terms of pitch class. If *CE 4q* were to actually move in reverse, the bass voice should ascend, not descend, which in turn demonstrates that chromatic framework running counter to the idea of reversing music. Finally, the subdued fanfare in *segment 3e*, *CE 4r,* consists of a T2 [0167] tetrachord descending by minor seconds while a T0 [06] dyad ascends in the upper voice, demonstrated in Figure 6.24. Voice exchange occurs between pitch class D and C, contributing to the long-scale chromatic framework that connects *segment 3e* and *3f*. *CE 4s* is the climax of the composition and will be discussed in more depth in Chapter 7.

Chromatic Framework

Now that the *chromatic events* in *segments 2k – 2l* and *3e – 3f* have been identified, the chromatic framework that runs through these sections can be discussed,

starting with *segment 3e*. Figure 6.25 shows a musical reduction of actual sounding key pitches of all the *chromatic events* contained in *segment 3e*. It is clear from this reduction that multiple chromatic ascents and descents occur in *segment 3e* that cycle at varying rates of speed. *CE 5i* contains two ascents that outline a 4:3 hemiola while *CE 4r* divides the nine measures into three three-measure units. One ascent and one descent occur in *CE 4r* in each of the three units, representing the slowest ascents and descents in *segment 3e*. *CE 5i* contains seven ascents and descents over the course of the nine measures, resulting in a 7:9 hemiola while *CE 6t* and *6u* contain twelve chromatic ascent transpositions over the course of nine measures, lining up with the 4:3 hemiola in *CE 5i.*

From the perspective of pitch class, *CE 6t* ends up right where it started at the beginning of *segment 3e* since it contains twelve complete C-B cycles over the course of *segment 3e*. *CE 6u* is comprised of PCo 5 that does not contain pitch class E, so it only results in approximately eleven complete pitch class cycles. *CE 6t* and *CE 6u* combine to present twenty-three complete C-B pitch class cycles in *segment 3e*. *CE 5h* contains two complete C-B pitch class cycles and *CE 4r, CE 10r*, and *CE 5i* combine for an additional two complete pitch class cycles of C-B. Therefore, the pitch content of *segment 3e* is a result of twenty-seven complete pitch class loops from C-B.

Segment 3e runs the risk of containing too much stasis; however, the *chromatic events* contained within have been carefully constructed to provide motion throughout *segment 3e*. The impetus for motion through s*egment 3e* comes from the moving stasis of *CE 4r* and *5h* and the range ascent of *CE 6t* and *6u.* Both *CE 4r* and *5h* utilize voice exchange that converges in the middle of the *segment,* resulting in stepwise motion that is static from the perspective of pitch class. The range ascent of *CE 6t* is a result of

transposing the ostinato by minor ninths rather than minor seconds. This wide transposition ends up transforming static pitch class loops into teleological gestures. *CE 10r* also contributes to motion throughout *segment 3e* through its gradual ascent.

Figure 6.26 shows a reduction with pitches transposed to discernable octaves of *segments 3e – 3g*, showing that *segment 3e* connects *segment 3f* through chromatic ascent and descent. The ultimate goal of the ascents and descents in *segment 3e* is the pitch class C arrival in *segment 3g*. The lower voice descent of *CE 4r* connects *CE 9s, 8ag,* and *8ah* resulting in a TE {0123} tetrachord. The upper voice ascent of *CE 4r* connects to *CE 8aj*, resulting in a T6 {0123} tetrachord. *CE 8aj* also completes the upper voice of *CE 5h* while the ascent of *CE 6t* and *6u* anticipates the arrival of *CE9s, 8ah,* and *8ai*. The lower voice of *CE 5h* does not arrive on pitch class C until *segment 3g*.

The arrival on pitch class C in *segment 3g* is strengthened by *CE 6x*, which ascends from pitch class A to B. Since, *CE 6x* completes an ascent, and the lower voice of *CE 5h* descends, the framework projects an upper and lower chromatic neighbor convergence into a unison, similar to an actual Phrygian cadence, or how an augmented sixth chord moves to a dominant chord in traditional music theory.

Segments 2k – 2o contain a similar chromatic framework, which is reduced, with octave displacements, in Figure 6.27. Four *chromatic events* in *segment 2k* collapse into two *chromatic events* in *segment 2l*, similar to how the ascents and descents in *segment 3e* eventually collapse into *CE 8u* in *segment 3g*. *CE 5e* and *CE 4m* collapse into *CE 4n,* while *CE 6l* continues the pitch class looping of *CE 6h* and *CE 6h* and *6i*. The strong pitch class C# and D in *segment 2l* is accented by voice exchange in *CE 4n* and carries over into *segment 2m* and *2n*. Pitch class C reappears in *segment 2n*, signaling a descent

from pitch class D, initiated by the bass voice in *segment 2m*. The T0 {0123} trichord of *CE 8ac* inverts over the axis of C and B in *CE 7o*, resulting in pitch class C centricity in *segment 2o*. The framework from *segments 2l – 2o* demonstrates that the pitch apex, which occurs in *segment 2m,* occurs earlier than the climax of *Section 2 Call, segment 2o*.

Summary

Taken on its own, any one *chromatic event* that occurs in *segments 2k* or *3e* projects a relatively lukewarm musical idea. Variation of these *chromatic events* occurs throughout, but within a very narrow musical range which does not guarantee musical intrigue. Additionally, masking can be so severe that identifying the mechanics of *chromatic events* by ear can become an act of futility. While these statements may seem critical or harsh, it is exactly these characteristics that contribute to the totality of these *chromatic events* producing engaging and effective music. In other words, the manner in which *chromatic events* collaborate results in this composition projecting a much greater musical meaning than the sum of its parts.

Additionally, traditional musical devices like voice exchange, that can inherently occur within a *chromatic event* sub-group, fulfill different functions in different *segments* depending on the current need of the concerto. A transformed arpeggiation can convey a sense of stasis in one *segment* and establish important pedal structures in another. The change in use of *chromatic events* is another example of the *chromatic event* transformation loop discussed at the end of Chapter 3 and integral to the *work-idea* of this concerto. The *work-idea* of identity through iterative loops is further strengthened by the numerous chromatic ascents and descents that occur in *segments 2k – 2o* and *3e – 3g.*

These pitch class loops give the illusion of being able to create an infinite amount of musical variation despite the narrow restrictions on how *chromatic events* are transformed.

Table 6.1: Similar *segments* in *Section 2 Call* and *Section 3 Call* in Beat Furrer's *Konzert für Klavier und Orchester*

ID	Descriptive Name	mm.
2c	Octaves I	134-138
2h	Octaves II	165-171
3d	Octaves III	316-320
2l	Fanfare I	193-198
2p	Fanfare II	229-235
3a	Fanfare III	296-301
3h	Fanfare IV	346-354
2o	High Piano Chords I	220-228
3g	High Piano Chords II	341-345
2k	Piano Ascent I	182-192
3e	Piano Ascent II	321-329
2m	Solo Piano Clusters I	199-209
2n	Double Piano Clusters II	210-219
3f	Double Piano Clusters II	330-340

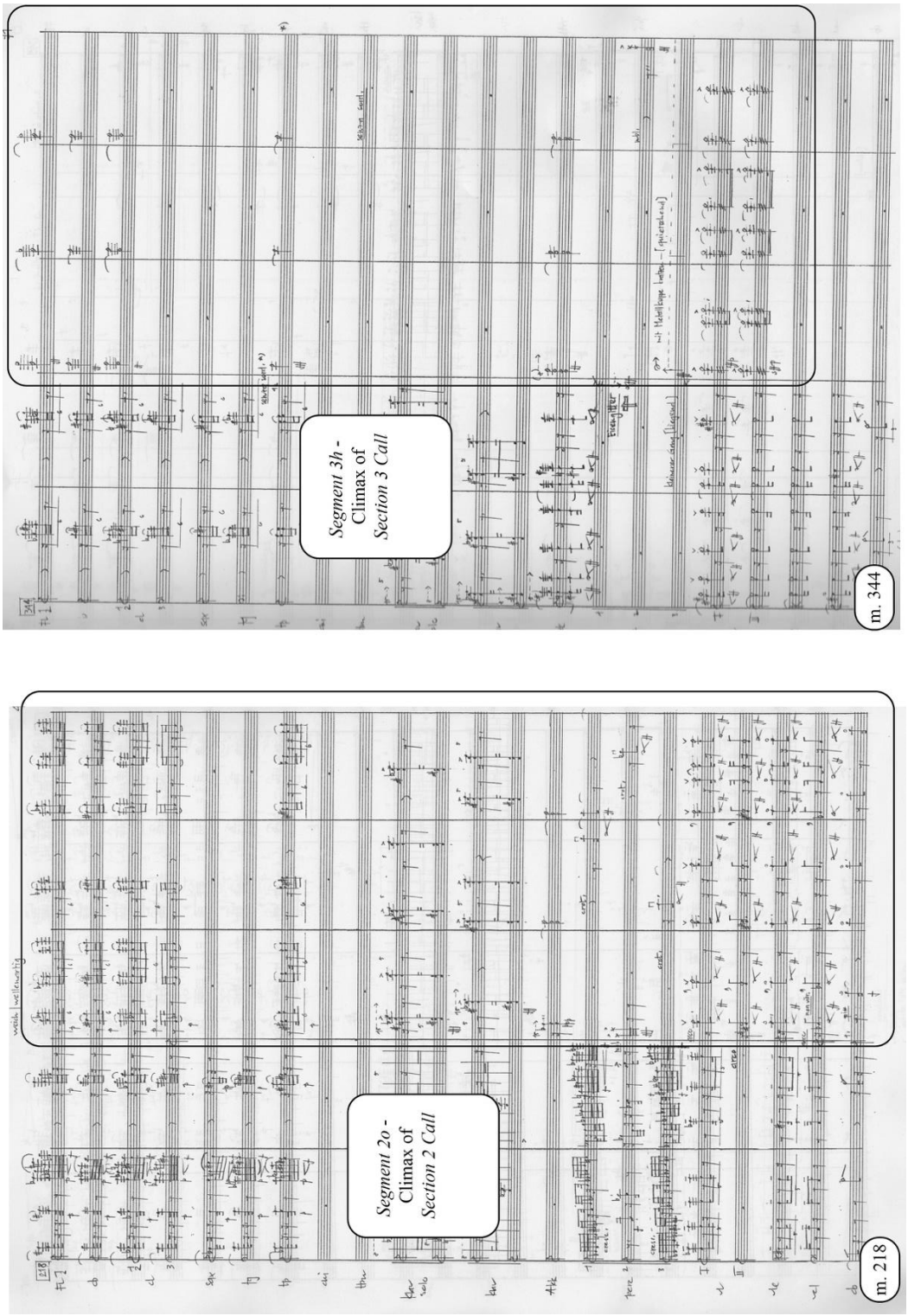


Figure 6.1: Climax of *Section 2 Call* and *Section 3 Call* in Beat Furrer's *Konzert für Klavier und Orchester*

Table 6.2: *Segments 2j – 2l* from Beat Furrer's *Konzert für Klavier und Orchester*

mm.	177 178 179	180 181	182 183 184	185 186 187 188 189	190 191 192	193 194	195 196 197 198
Segment	2j		2k			2l	
Name	Rising Arpeggio II		Piano Ascent I			Fanfare I	
CEG4 15Sust			m. Chromatic Connections			n. 2, 3, 2, 1, 0 - 1, 2, 1, 2	
CEG5 EnsChrom			f. {4, 5, 6, 7, 8, 9} - M3 Gliss. up then m3 Gliss. down				
			e. [T4], [E5], [06], [17], [28], [39], [4T], [50], [61] w/ [E4], [T3], [93], [82], [71], [60], [5E], [4T], [39] Lower Voice Descent				
CEG6 32Ost	g. PCo1 - 15-note Ostinato T2, T3, T4, T5, T4, T7		h./i. PCo115-note Ostinato + PCo5 13-note Ostinato T0 - TE			l. PCo1 - 15-note 2 voice ostinati P4 T0, T1, T2, T3, T4, T5, T6	
			j. PCo6 - 9-note Ostinato in winds				
			k. PCo6 - 9-note Ostinato in strings varied m. 187				
CEG7 PnoPed							
CEG8 ArtPed	z. [123]						
CEG9 SusPed	l. [2389]						
CEG10 MovPed	l. [TE014567] - [1236789]						

Table 6.3: *Segments 3d – 3f* from Beat Furrer's *Konzert für Klavier und Orchester*

mm.	316 317 318 319 320	321 322 323 324 325 326 327 328 329	330 331 332 333 334 335 336 337 338 339 340
Segment	3d	3e	3f
Name	Piano Octaves III	Piano Ascent II	Double Piano Clusters II
CEG4 15Sust		r. {2, 1, 0} {0, 1, 2} Voice Exchange	
CEG5 EnsChrom		i. {4, 5, 6, 7, 8, 9} - M3 up, m3 down h. [82], [93], [T4], [E5], [06], [17], [28] Upper Voice Ascent [71], [60], [5E] , [4T] , [39], [20], [17] Lower Voice Ascent	
CEG6 32Ost		t./u. PCo115-note Ostinato + PCo5 13-note Ostinato T0 - TE	v. PCol1 15-note Ostinato w. PCol9 11-note Converging Ostinato x. Pcol1 T9, TT, TE
CEG7 PnoPed	t. [0] Octaves Articulated Pedal		
CEG8 ArtPed			ah./ai. E aj. [6789]
CEG9 SusPed	r. [48]		s. E
CEG10 MovPed	q. Various [012] Transpositions	r. [1278] 9-bar M9 Ascending Glissandi	

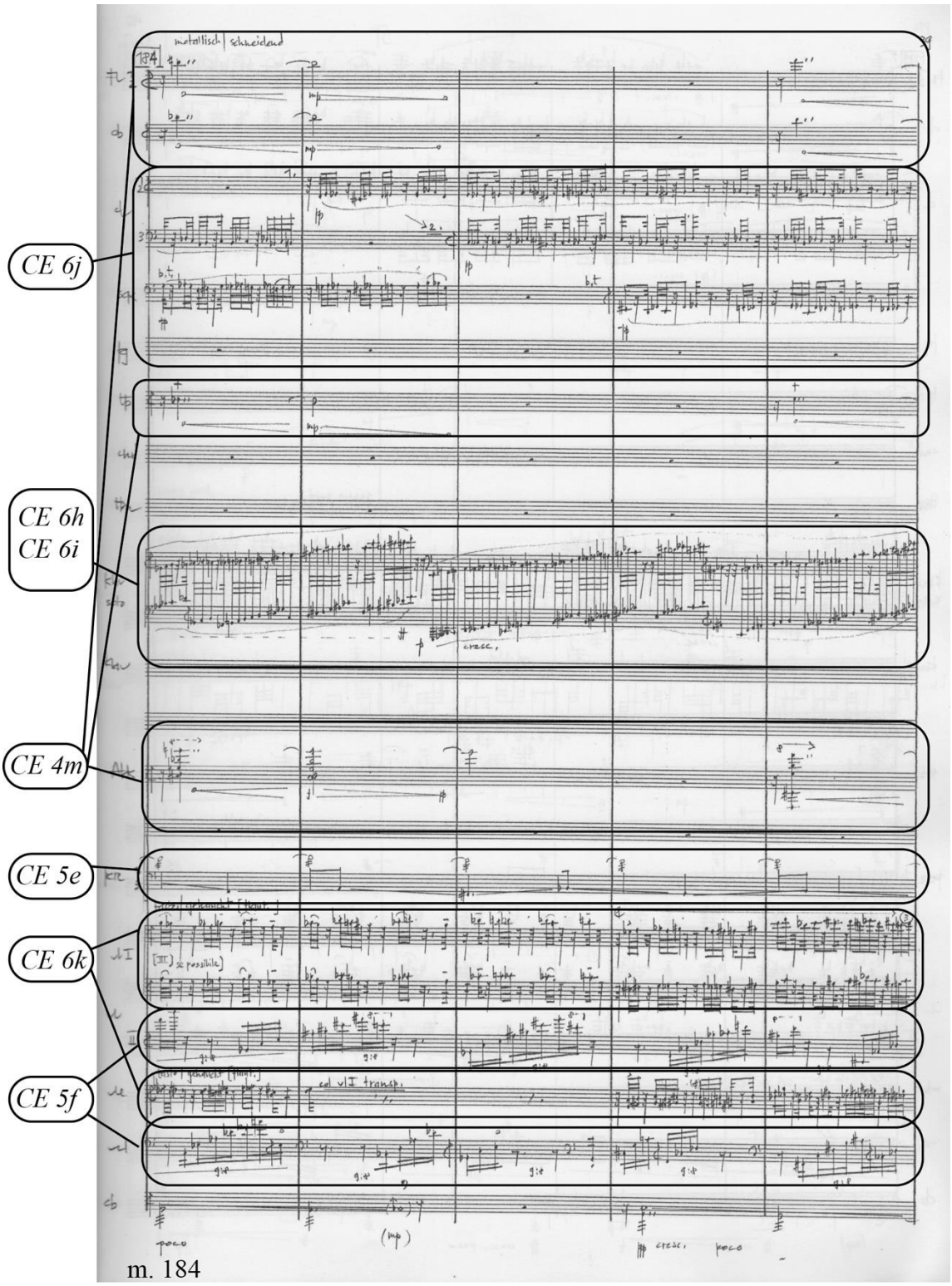


Figure 6.2: Opening measure of *chromatic events* in *segment 2k* from Beat Furrer's *Konzert für Klavier und Orchester*

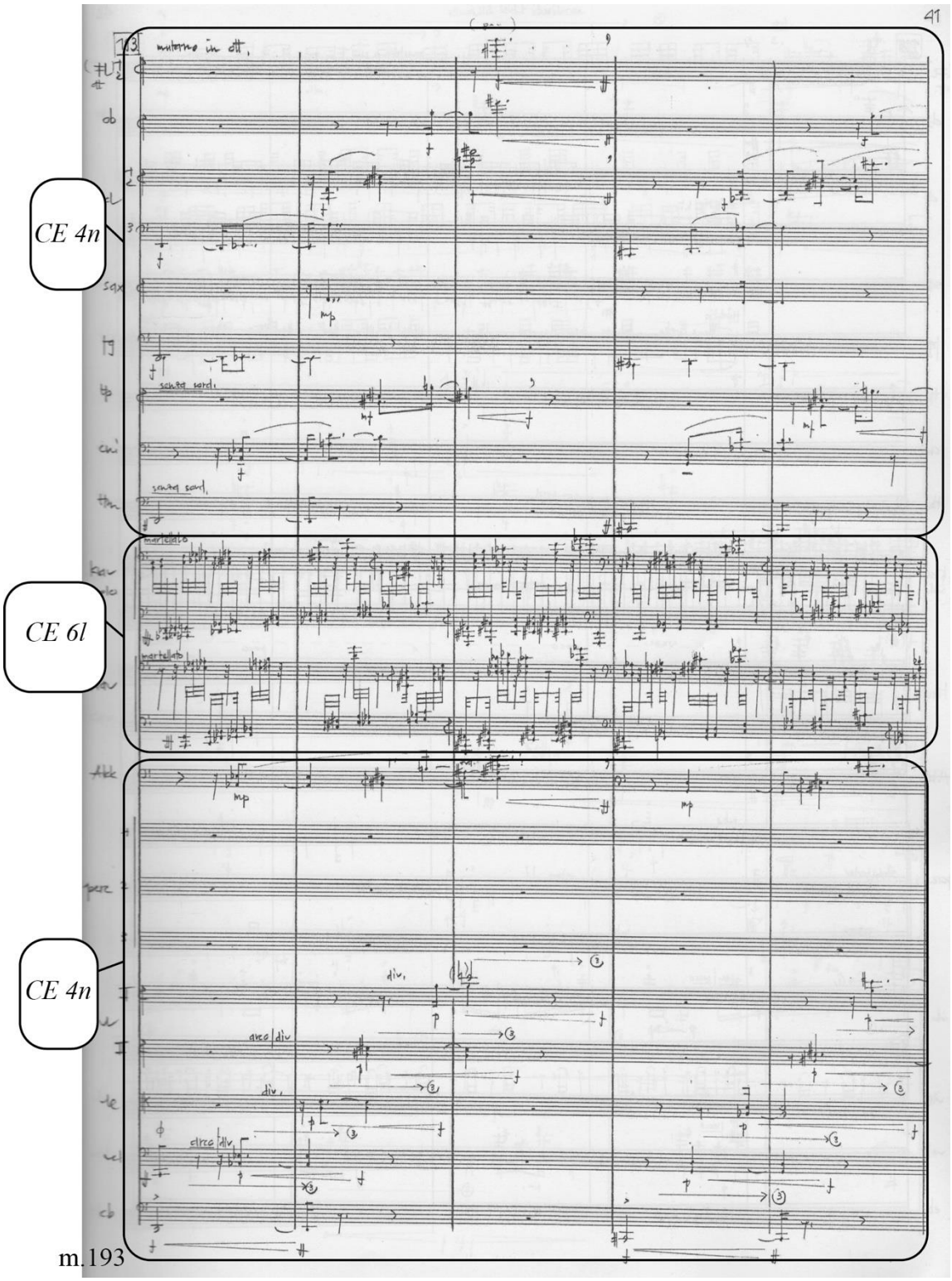


Figure 6.3: Opening measures of *chromatic events* in *segment 2l* from Beat *Furrer's Konzert für Klavier und Orchester*

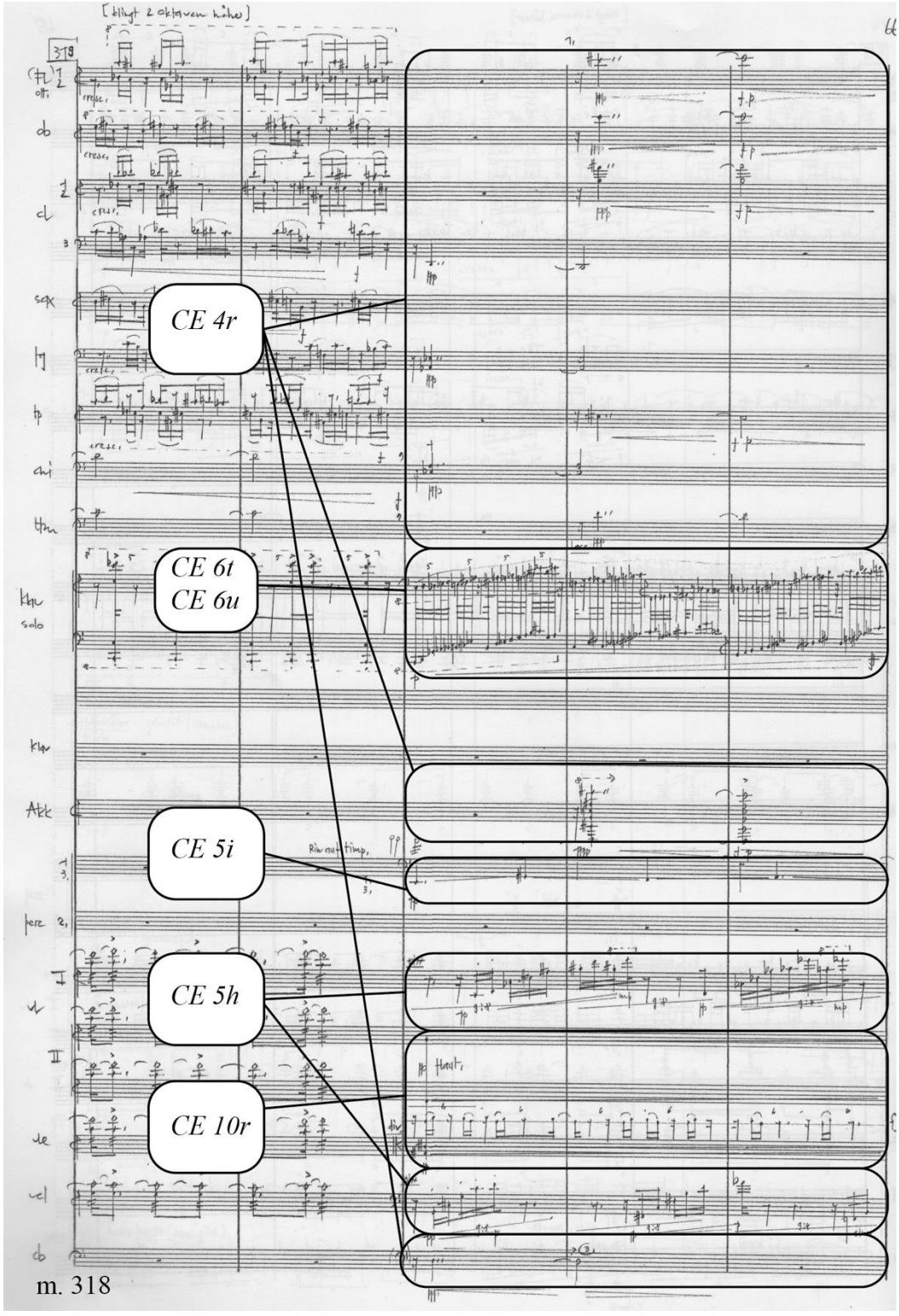


Figure 6.4: Opening measures of *chromatic events* in *segment 3e* from Beat Furrer's *Konzert für Klavier und Orchester*

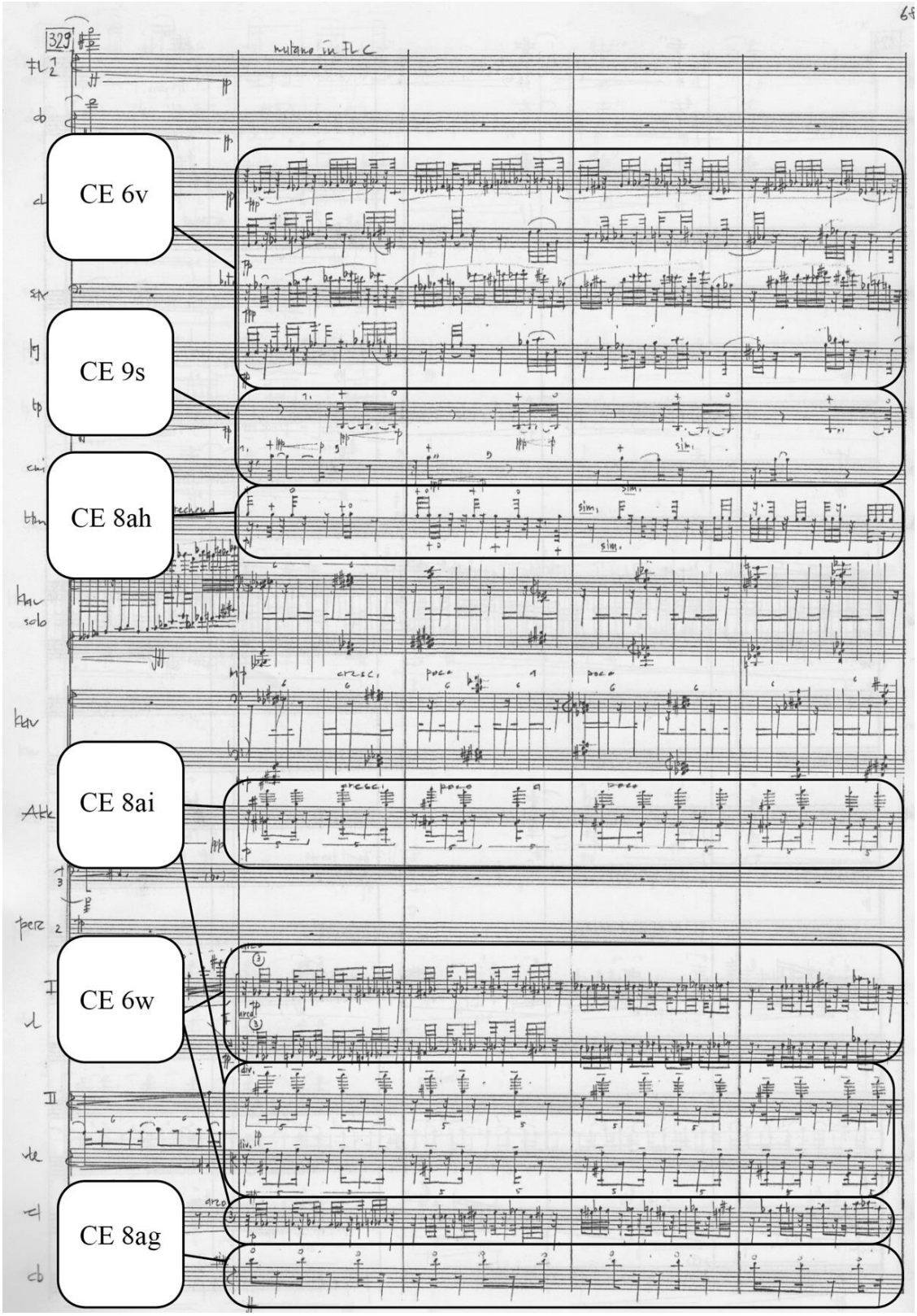


Figure 6.5: Opening measures of *chromatic events* in *segment 3f* from Beat Furrer's *Konzert für Klavier und Orchester*

Table 6.4: The *CE 4m* sub-group in Beat Furrer's *Konzert für Klavier und Orchester*

CE 4m Sub-Group			
ID	Location	Instrument	Notes
m	2k	Fl.. 1, Ob.1, Tpt. 1, Acc.	Chromatic Connections (CEG6)
n	2l	Ens. (no Perc.)	2, 3, 2, 1, 0 - 1, 2, 1, 2
o	2m	Ob. 1, Tpt. 1, Hrns. 1+2, Dbl. Bs.	Chromatic Connections (CEG6)
p	2p	Ens. (no Perc.)	0, 1, 2, 1, 2 - E, 0, 1, 2, 3
q	3a	Ens. (no Perc.)	1, 0, 1, [E0]
r	3e	Ens. (no Perc.)	2, 1, 0 - 0, 1, 2 Voice Exchange
s	3h	Ens. (no Perc.)	0, 1, 0, E

Table 6.5: The *CE 5a* sub-group in Beat Furrer's *Konzert für Klavier und Orchester*

CE 5a Sub-Group			
ID	Location	Instrument	Notes
a	1l	Vln. 1 + 2, Vla., Vc.	[E5], [06], [17], [28], [39] Upper Voice Ascent w/[T4], [93], [82], [71], [60] Lower Voice Descent
c	1n, m. 78	Vln. 2, Vla., Vc.	[17], [28], [39] , [4T] , [5E] Upper Voice Ascent w/[93], [71], [60], [5E], [4T] Lower Voice Descent
e	2k	Vln. 2, Vc.	[T4], [E5], [06], [17], [28], [39], [4T], [50], [61]Upper Voice Ascent w/ [E4], [T3], [93], [82], [71], [60], [5E], [4T], [39] Lower Voice Descent
h	3e	Vln. 1, Vc.	[82], [93], [T4], [E5], [06], [17], [28] Upper Voice Ascent [71], [60], [5E] , [4T] , [39], [20], [17] Lower Voice Ascent

Table 6.6: The *CE 5b* sub-group in Beat Furrer's *Konzert für Klavier und Orchester*

CE 5b Sub-Group			
ID	Location	Instrument	Notes
b	1n	Rin on Timpani (Perc. 1 + 3)	Two-voice ascending M3 descending m3 glissandi starting on [4] and descending M3 ascending m3 starting on [1] resulting in voice exchange
d	1r	Chinese Cymbal on Timpani (Perc. 1 + 3)	1, 0, E, T Descending Glissandi
f	2k	m. 182 Rin on Timpano (Perc. 3)	4, 5, 6, 7, 8, 9 (M3 Ascending Glissandi, then m3 Descending Glissandi)
g	2q	Perc. 1 + 3	1, 2, 3, 4, 5, 6, 7, 8, 9, T, E, 0
i	3e	Rin on Timpano (Perc. 3)	4, 5, 6, 7, 8, 9 M3 (Glissando Ascent then m3 Glissando Descent)

Table 6.7: The *CE 6h* sub-group in Beat Furrer's *Konzert für Klavier und Orchester*

CE 6h Sub-Group				
ID	Location	Instrument	Pco	Notes
h	2k	Solo Piano R. H.	Pco 1	15-note ostinato T0-TE elongated with rests
i	2k	Solo Piano L. H.	Pco 5	13-note ostinato T0-TE elongated with rests converges into CEG7g
t	3e	Solo Piano R. H.	Pco 1	15-note ostinato T0-TE
u	3e	Solo Piano L. H.	Pco 5	13-note ostinato T0-TE converges into CEG7g

Table 6.8: The *CE 10a* sub-group in Beat Furrer's *Konzert für Klavier and Orchester*

CE 10a Sub-Group			
ID	Location	Instrument	Notes
CE 10a	1g	Vln. 2, Vla., Vc.	[12378] - [3459T] 8-bar M2 Ascending Glissandi
CE 10b	1k	Vln. 2, Vla., Vc.	10-bar M2 Ascending Glissandi
CE 10g	2d	Vln. 1 + 2, Vla., Vc.	[349T] 5-bar Wedge Glissandi
CE 10m	2m	Vln. 2, Vla.	[2378] Converging Glissandi
CE 10o	2q	Vln. 2, Vla.	[2378] Converging Glissandi
CE 10r	3e	Vln.2, Vla	[1278] - [359T] 9-bar M9 Ascending Glissandi

Table 6.9: PCo 1 used in Beat Furrer's *Konzert für Klavier und Orchester*

Pitch Collection 1														
0	2	1	3	5	4	6	8	7	6	9	8	10	9	11
1	3	2	4	6	5	7	9	8	7	10	9	11	10	0
2	4	3	5	7	6	8	10	9	8	11	10	0	11	1
3	5	4	6	8	7	9	11	10	9	0	11	1	0	2
4	6	5	7	9	8	10	0	11	10	1	0	2	1	3
5	7	6	8	10	9	11	1	0	11	2	1	3	2	4
6	8	7	9	11	10	0	2	1	0	3	2	4	3	5
7	9	8	10	0	11	1	3	2	1	4	3	5	4	6
8	10	9	11	1	0	2	4	3	2	5	4	6	5	7
9	11	10	0	2	1	3	5	4	3	6	5	7	6	8
10	0	11	1	3	2	4	6	5	4	7	6	8	7	9
11	1	0	2	4	3	5	7	6	5	8	7	9	8	10
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

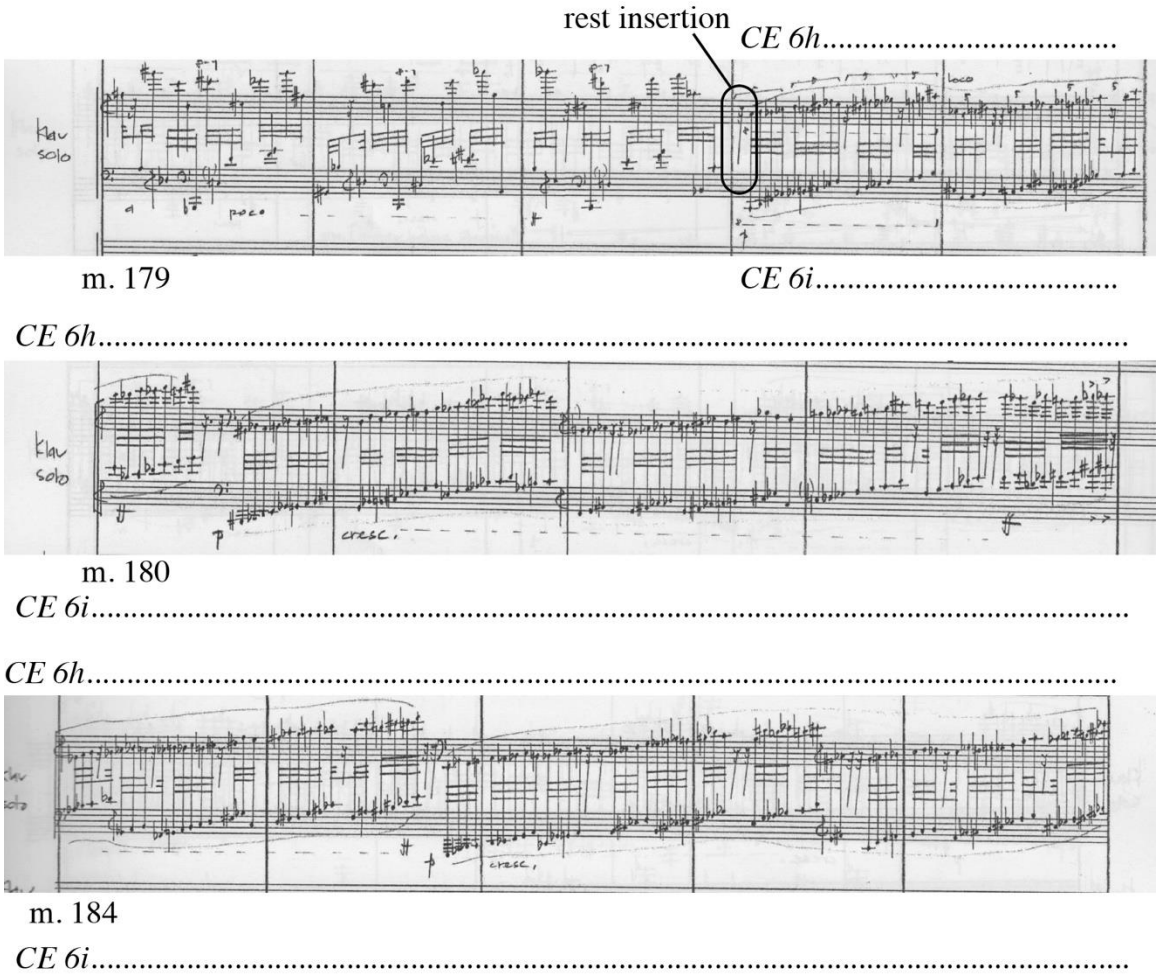


Figure 6.6: Rest insertion in *CE 6h* and *CE 6i* in *segment 2k* of Beat Furrer's *Konzert für Klavier und Orchester*

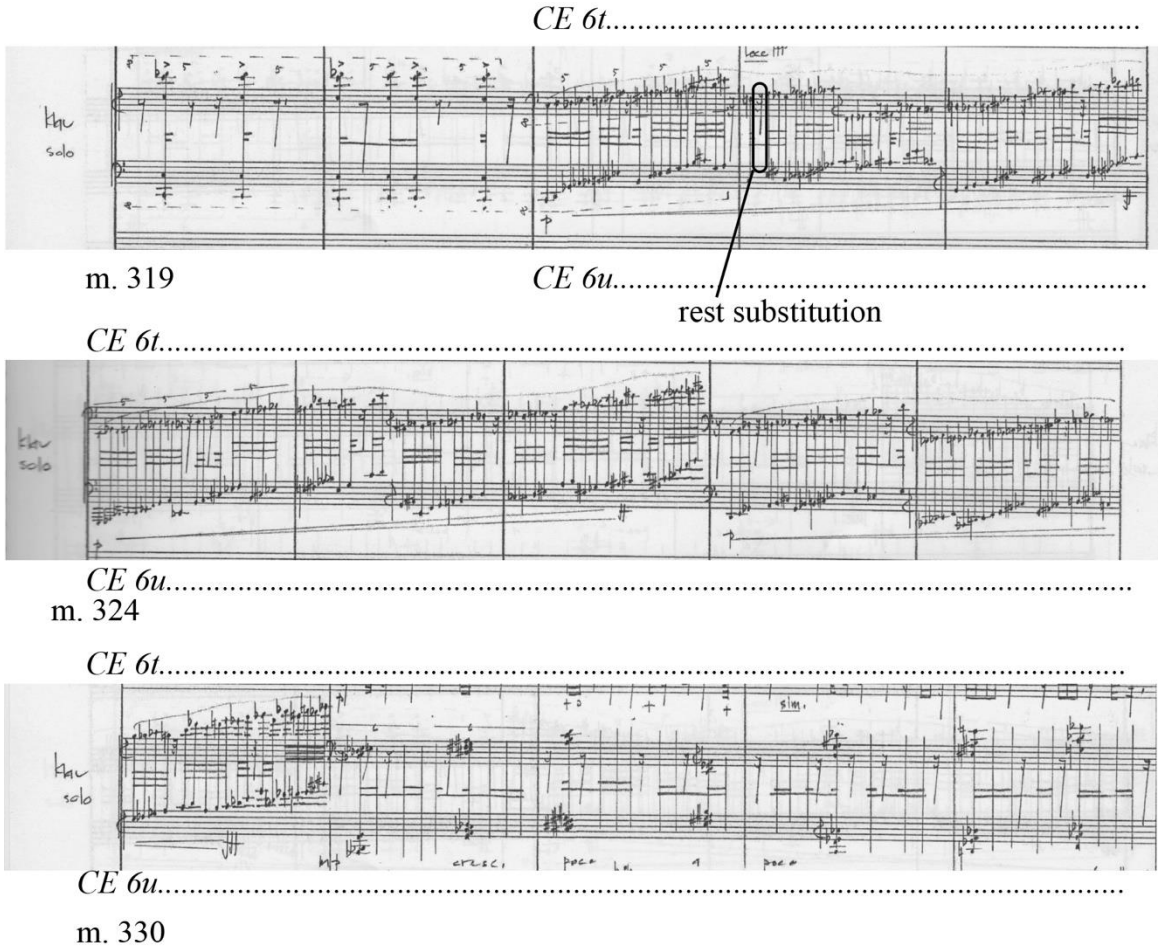


Figure 6.7: Rest substitution in *CE 6t* and *CE 6u* in *segment 3e* of Beat Furrer's *Konzert für Klavier und Orchester*

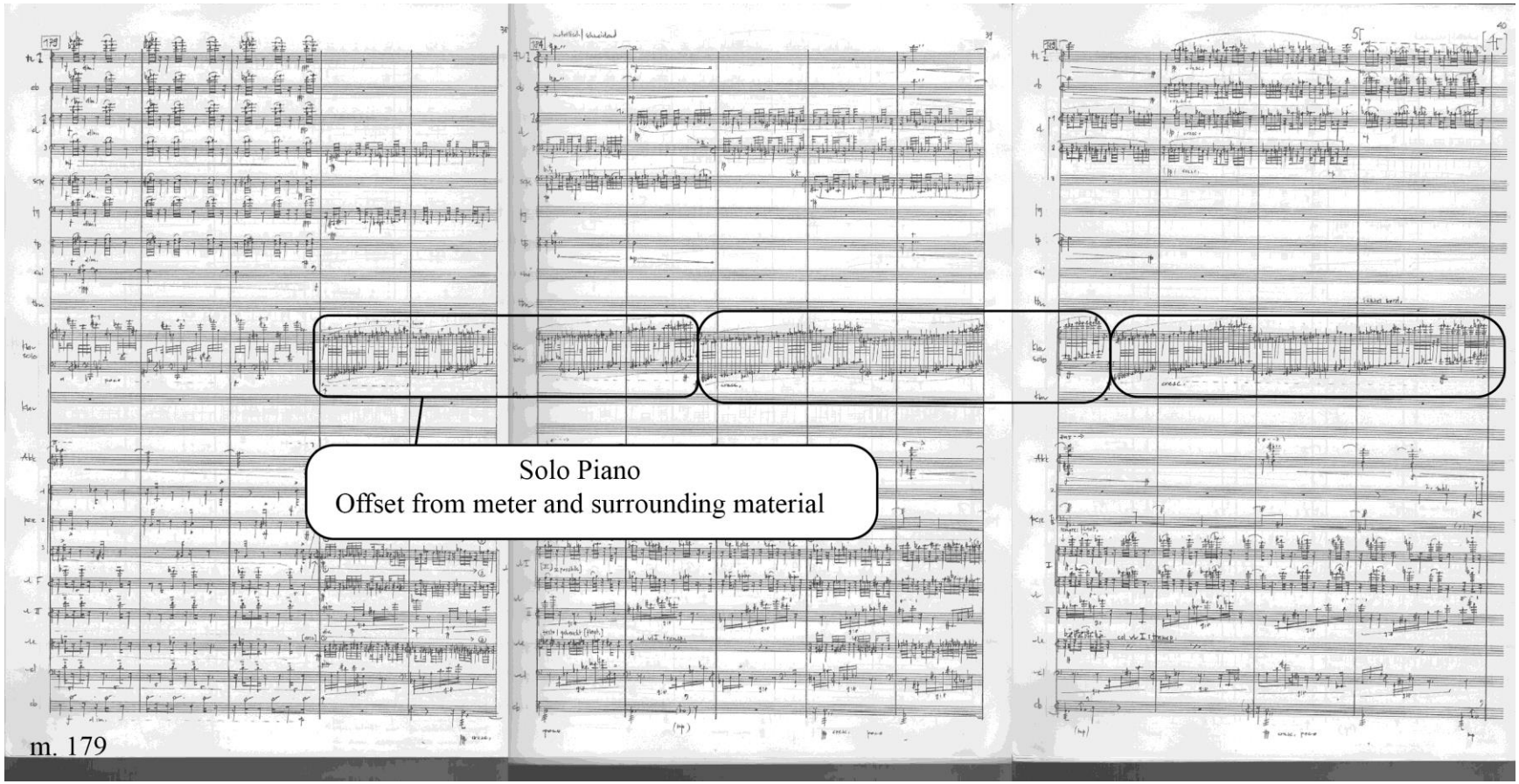


Figure 6.8: Solo piano ascents offset from the meter and ensemble in *segment 3e* of Beat Furrer's *Konzert für Klavier und Orchester*

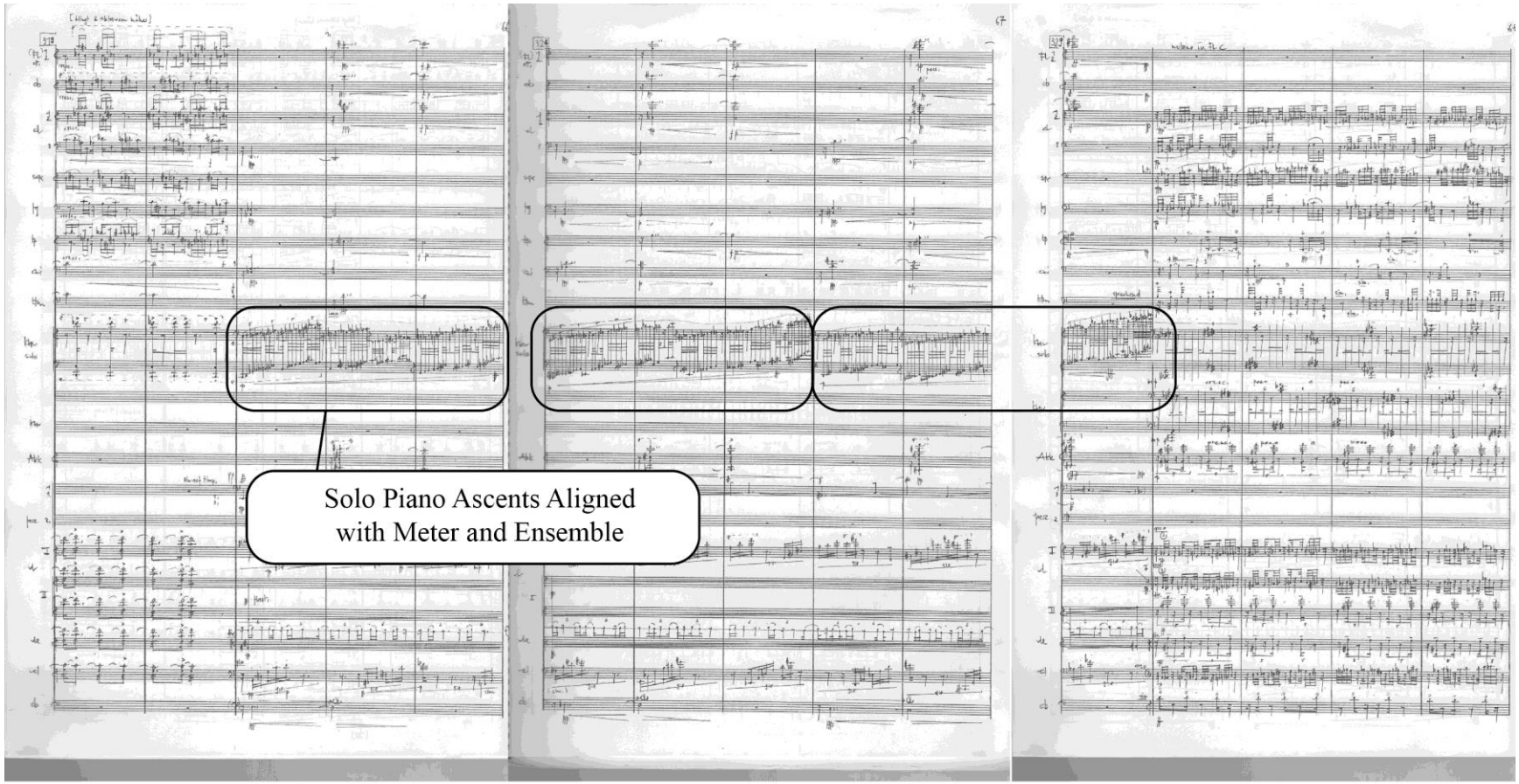


Figure 6.9: Solo piano ascents aligned with the meter and ensemble in *segment 3e* of Beat Furrer's *Konzert für Klavier und Orchester*

Figure 6.10: *CE 6t* and *CE 6u* in *segment 3e* from Beat Furrer's *Konzert für Klavier und Orchester*

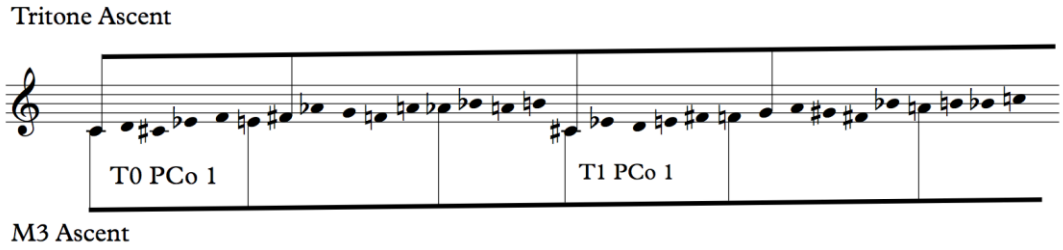


Figure 6.11: Symmetrical construction of PCo 1in *CE 6t* in from Beat Furrer's *Konzert für Klavier und Orchester*

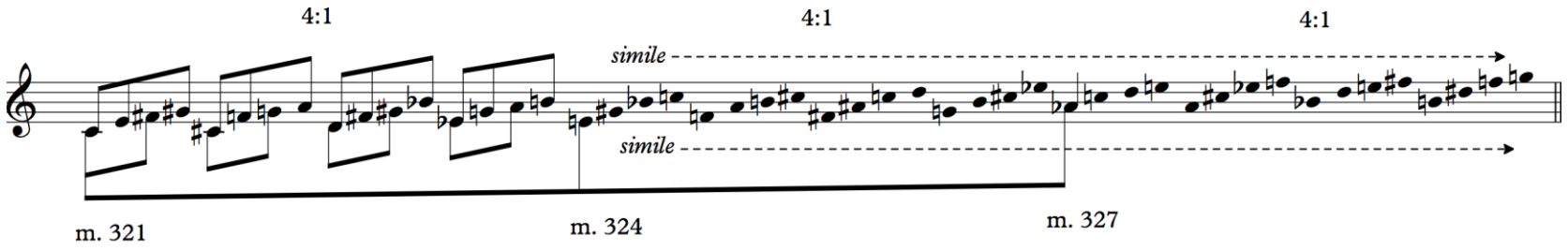


Figure 6.12: Chromatic ascents moving at different rates of speed in *CE 6t*

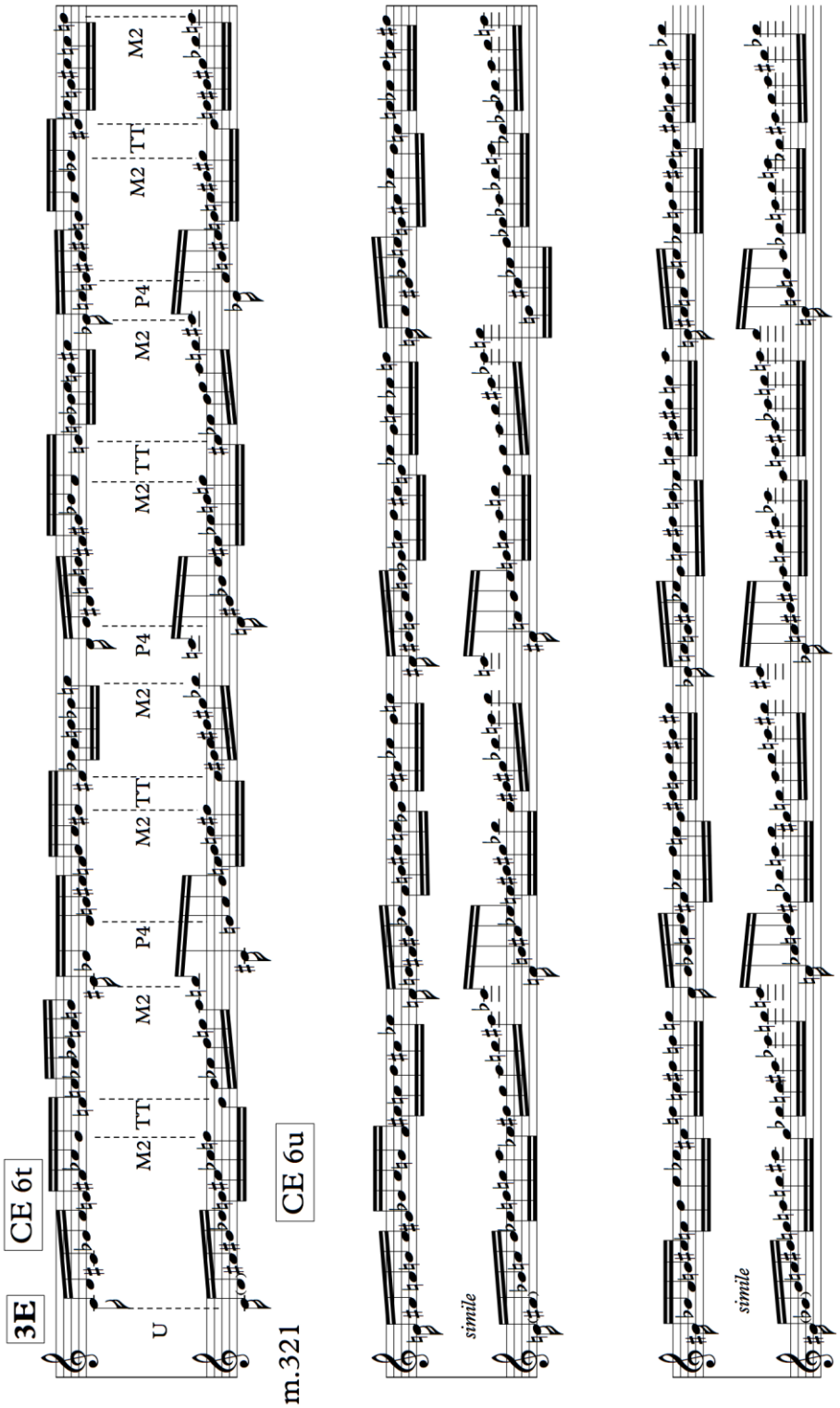


Figure 6.13: Intervallic relationship between *CE 6t* and *CE 6u* in *segment 3e* of Beat Furrer's *Konzert für Klavier und Orchester*

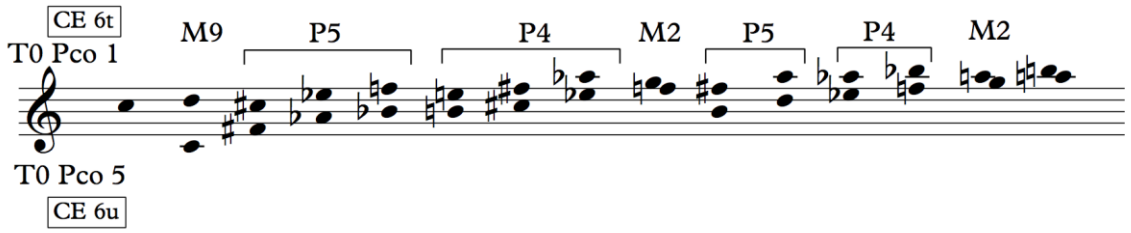


Figure 6.14: Intervallic contraction between *CE 6t* and *CE 6u* in mm. 321 – 323 of Beat Furrer's *Konzert für Klavier und Orchester*

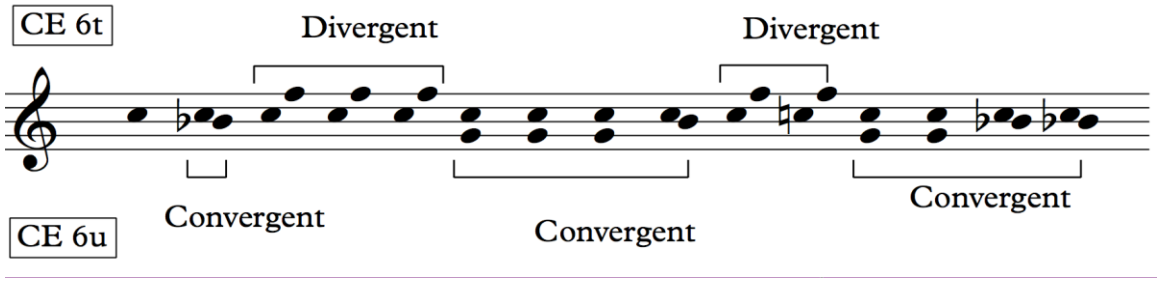


Figure 6.15: *CE 6t* transposed to C with *CE 6u* in mm. 321 – 323 of Beat Furrer's *Konzert für Klavier und Orchester*

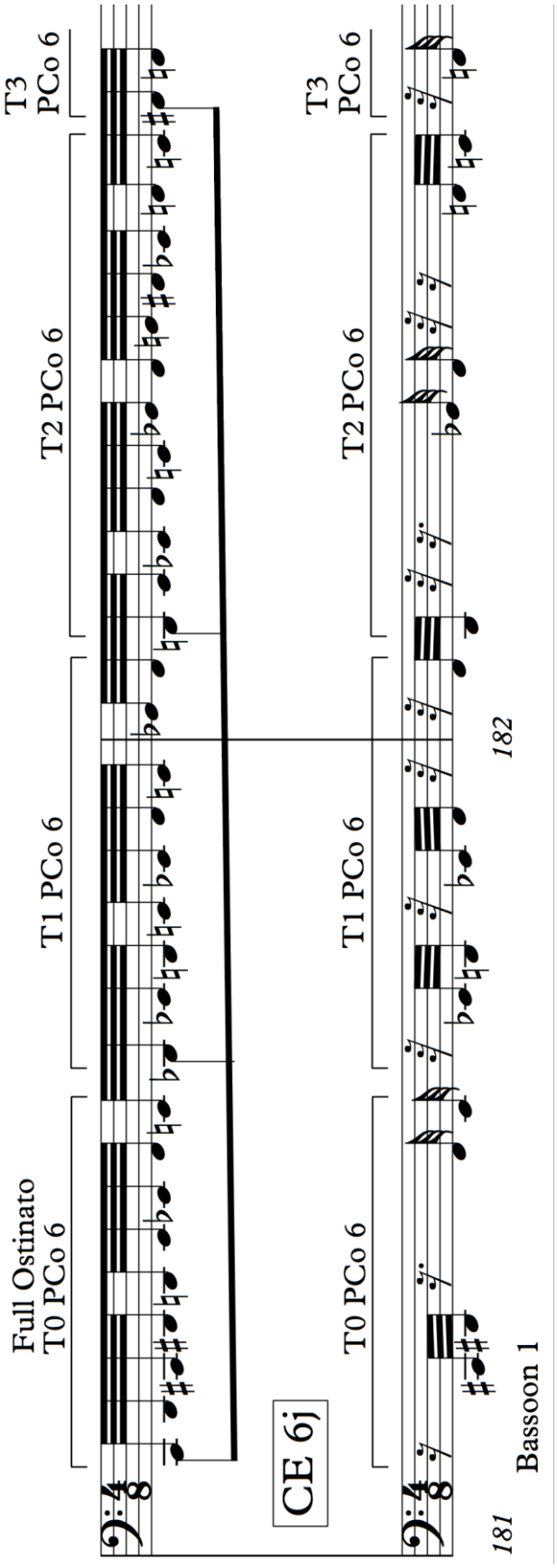


Figure 6.16: Basson part of *CE 6j* in *segment 2k* of Beat Furrer's *Konzert für Klavier und Orchester*

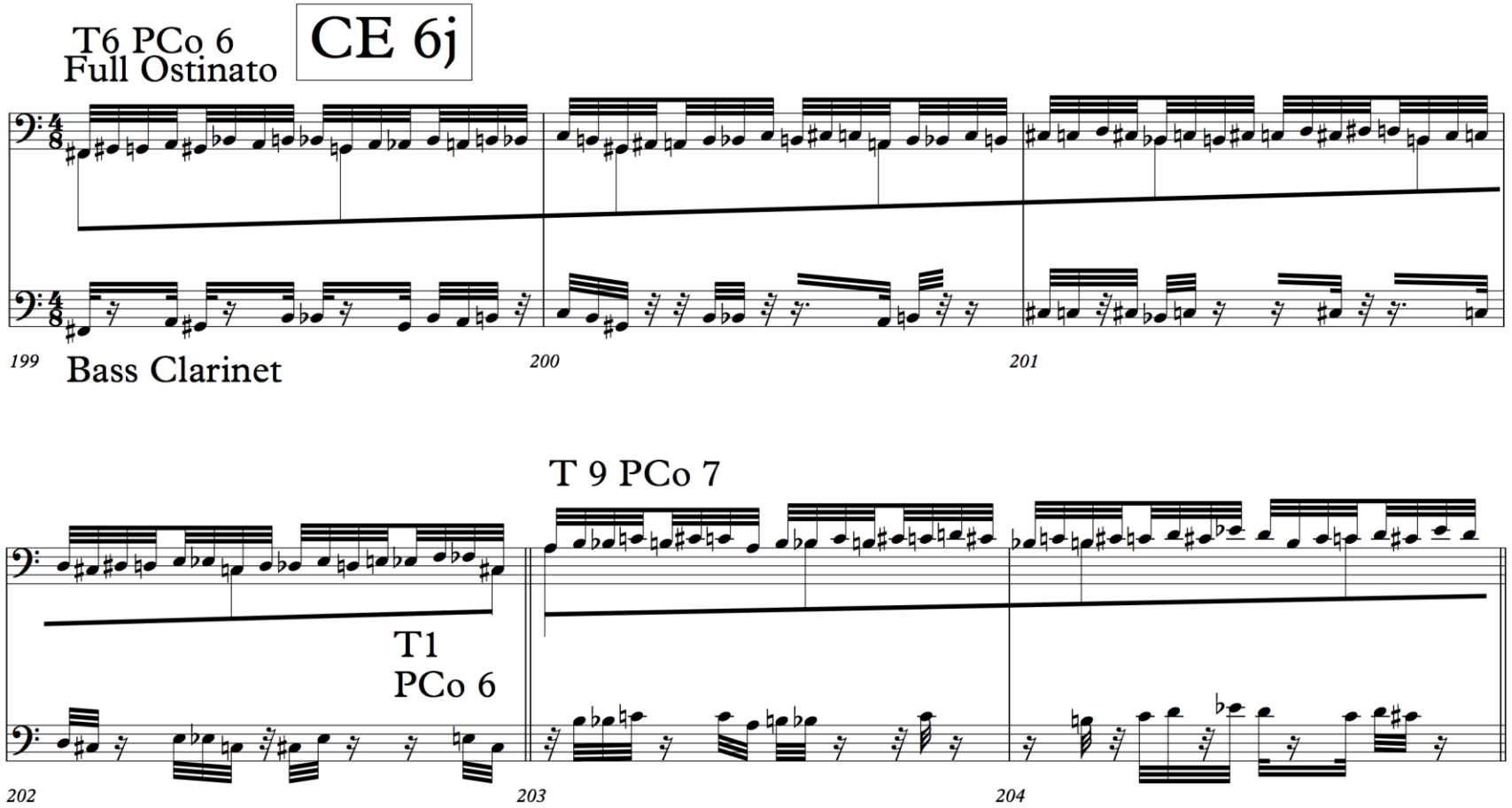


Figure 6.26: Variation of *CE 6j* in mm.299 – 304 of Beat Furrer's *Konzert für Klavier und Orchester*

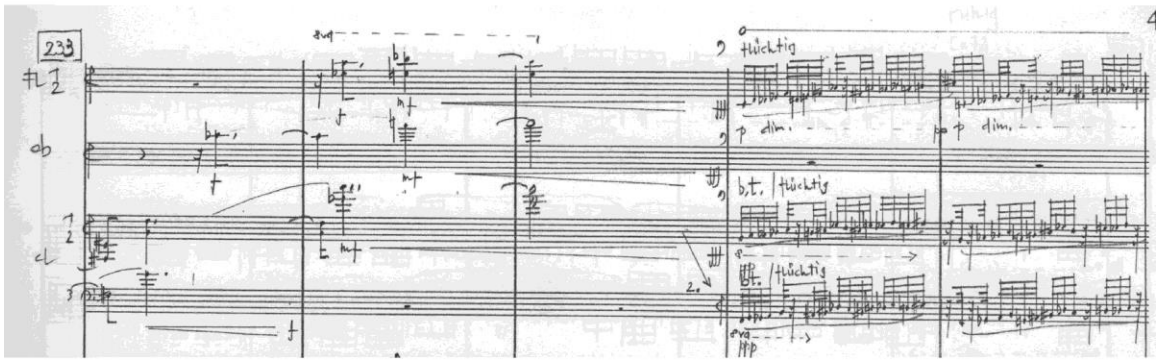
Table 6.10: PCo 6 used in Beat Furrer's *Konzert für Klavier und Orchester*

Pitch Collection 6								
0	2	1	3	2	4	3	5	4
1	3	2	4	3	5	4	6	5
2	4	3	5	4	6	5	7	6
3	5	4	6	5	7	6	8	7
4	6	5	7	6	8	7	9	8
5	7	6	8	7	9	8	10	9
6	8	7	9	8	10	9	11	10
7	9	8	10	9	11	10	0	11
8	10	9	11	10	0	11	1	0
9	11	10	0	11	1	0	2	1
10	0	11	1	0	2	1	3	2
11	1	0	2	1	3	2	4	3
1	2	3	4	5	6	7	8	9

Table 6.11: PCo 7 used in Beat Furrer's *Konzert für Klavier und Orchester*

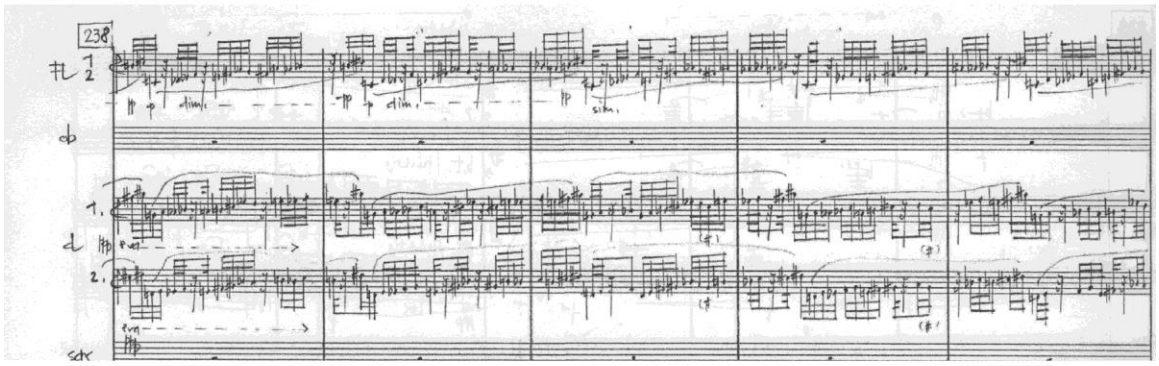
Pitch Collection 7								
0	2	1	3	2	4	3	0	2
1	3	2	4	3	5	4	1	3
2	4	3	5	4	6	5	2	4
3	5	4	6	5	7	6	3	5
4	6	5	7	6	8	7	4	6
5	7	6	8	7	9	8	5	7
6	8	7	9	8	10	9	6	8
7	9	8	10	9	11	10	7	9
8	10	9	11	10	0	11	8	10
9	11	10	0	11	1	0	9	11
10	0	11	1	0	2	1	10	0
11	1	0	2	1	3	2	11	1
1	2	3	4	5	6	7	8	9

CE 6r.....



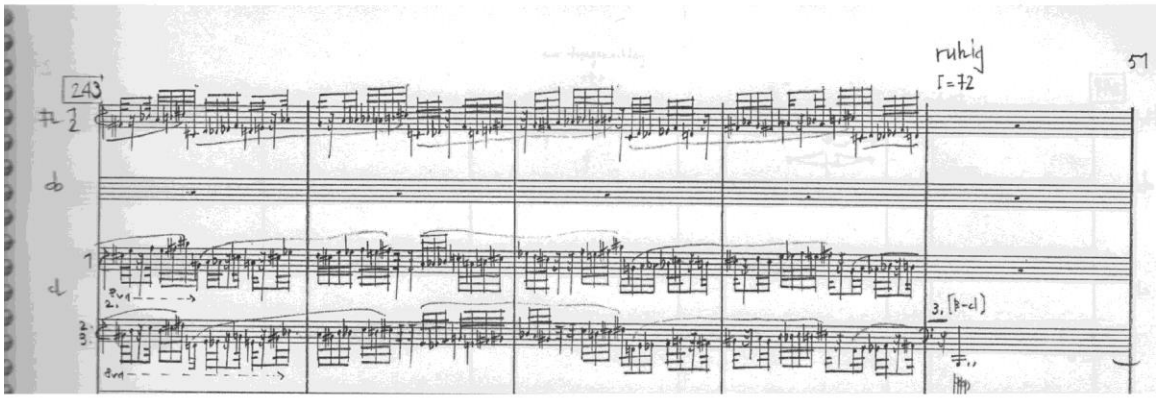
m.233 m.236 (*segment 2q*)

CE 6r.....



m.238

CE 6r.....



m.243

Figure 6.18: *CE 6r* in *segment 2q* from Beat Furrer's *Konzert für Klavier und Orchester*

Table 6.12: PCo 8 used in Beat Furrer's *Konzert für Klavier und Orchester*

Pitch Collection 8																
0	2	1	3	5	2	4	6	8	9	7	9	8	10	9	11	1
1	3	2	4	6	3	5	7	9	10	8	10	9	11	10	0	2
2	4	3	5	7	4	6	8	10	11	9	11	10	0	11	1	3
3	5	4	6	8	5	7	9	11	0	10	0	11	1	0	2	4
4	6	5	7	9	6	8	10	0	1	11	1	0	2	1	3	5
5	7	6	8	10	7	9	11	1	2	0	2	1	3	2	4	6
6	8	7	9	11	8	10	0	2	3	1	3	2	4	3	5	7
7	9	8	10	0	9	11	1	3	4	2	4	3	5	4	6	8
8	10	9	11	1	10	0	2	4	5	3	5	4	6	5	7	9
9	11	10	0	2	11	1	3	5	6	4	6	5	7	6	8	10
10	0	11	1	3	0	2	4	6	7	5	7	6	8	7	9	11
11	1	0	2	4	1	3	5	7	8	6	8	7	9	8	10	0
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

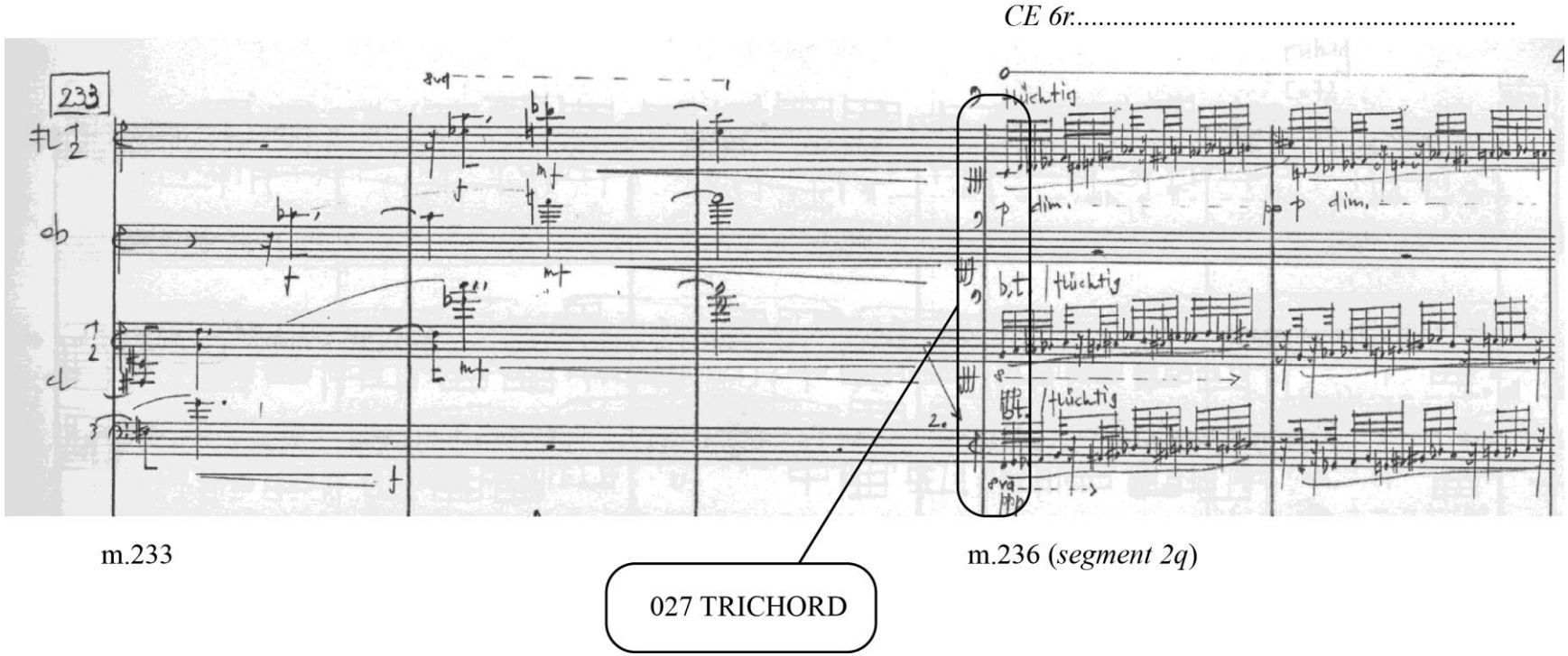


Figure 6.19: [027] Trichord in *CE 6r* from Beat Furrer's *Konzert für Klavier und Orchester*

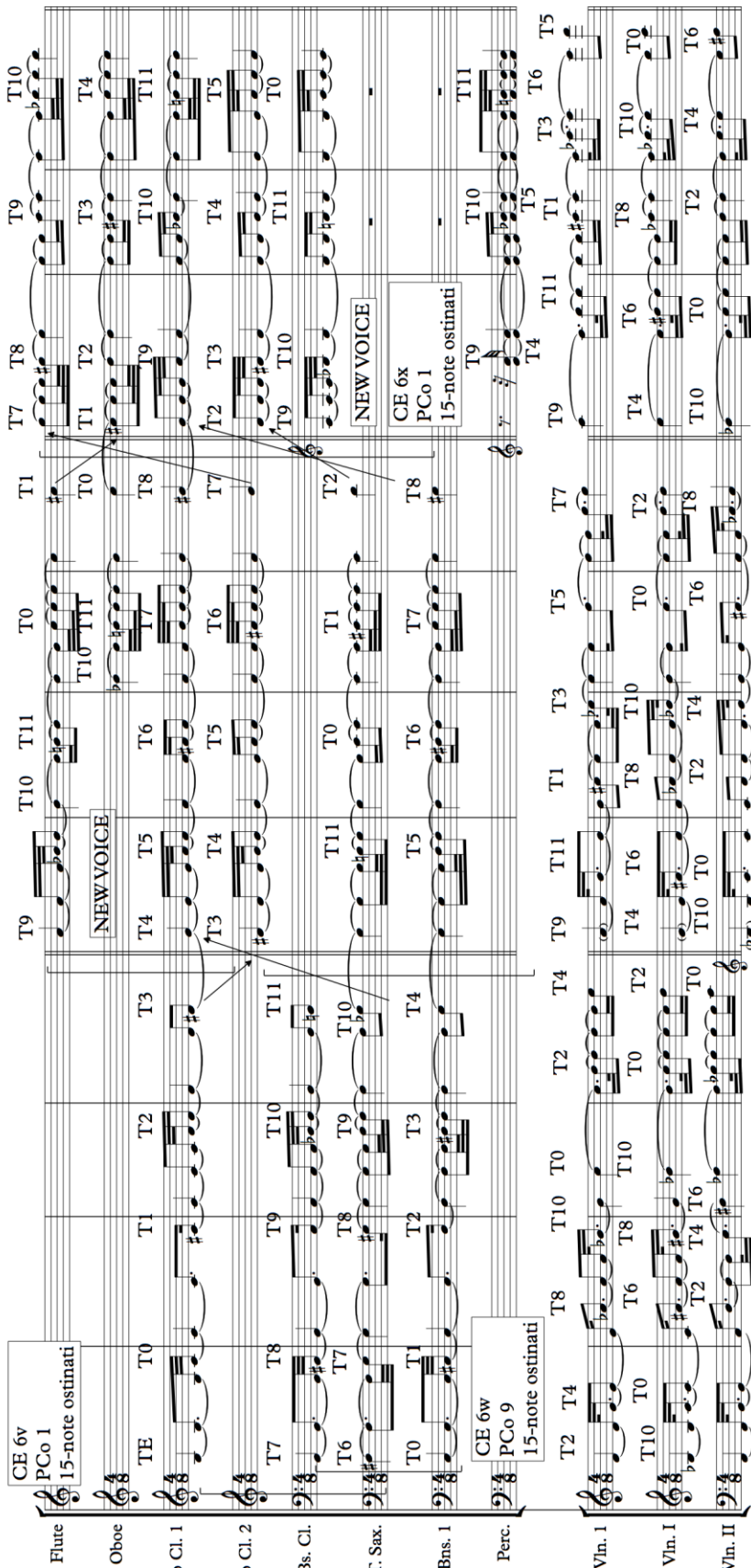


Figure 6.20: Transpositional framework of *CE 6v*, *6w*, and *6x* in segment 3e of Beat Furrer's *Konzert für Klavier und Orchester*

Pitch Collection 9										
0	2	1	3	2	4	3	5	4	6	5
1	3	2	4	3	5	4	6	5	7	6
2	4	3	5	4	6	5	7	6	8	7
3	5	4	6	5	7	6	8	7	9	8
4	6	5	7	6	8	7	9	8	10	9
5	7	6	8	7	9	8	10	9	11	10
6	8	7	9	8	10	9	11	10	0	11
7	9	8	10	9	11	10	0	11	1	0
8	10	9	11	10	0	11	1	0	2	1
9	11	10	0	11	1	0	2	1	3	2
10	0	11	1	0	2	1	3	2	4	3
11	1	0	2	1	3	2	4	3	5	4
1	2	3	4	5	6	7	8	9	10	11

Table 6.13: PCo 9 used in Beat Furrer's *Konzert für Klavier und Orchester*

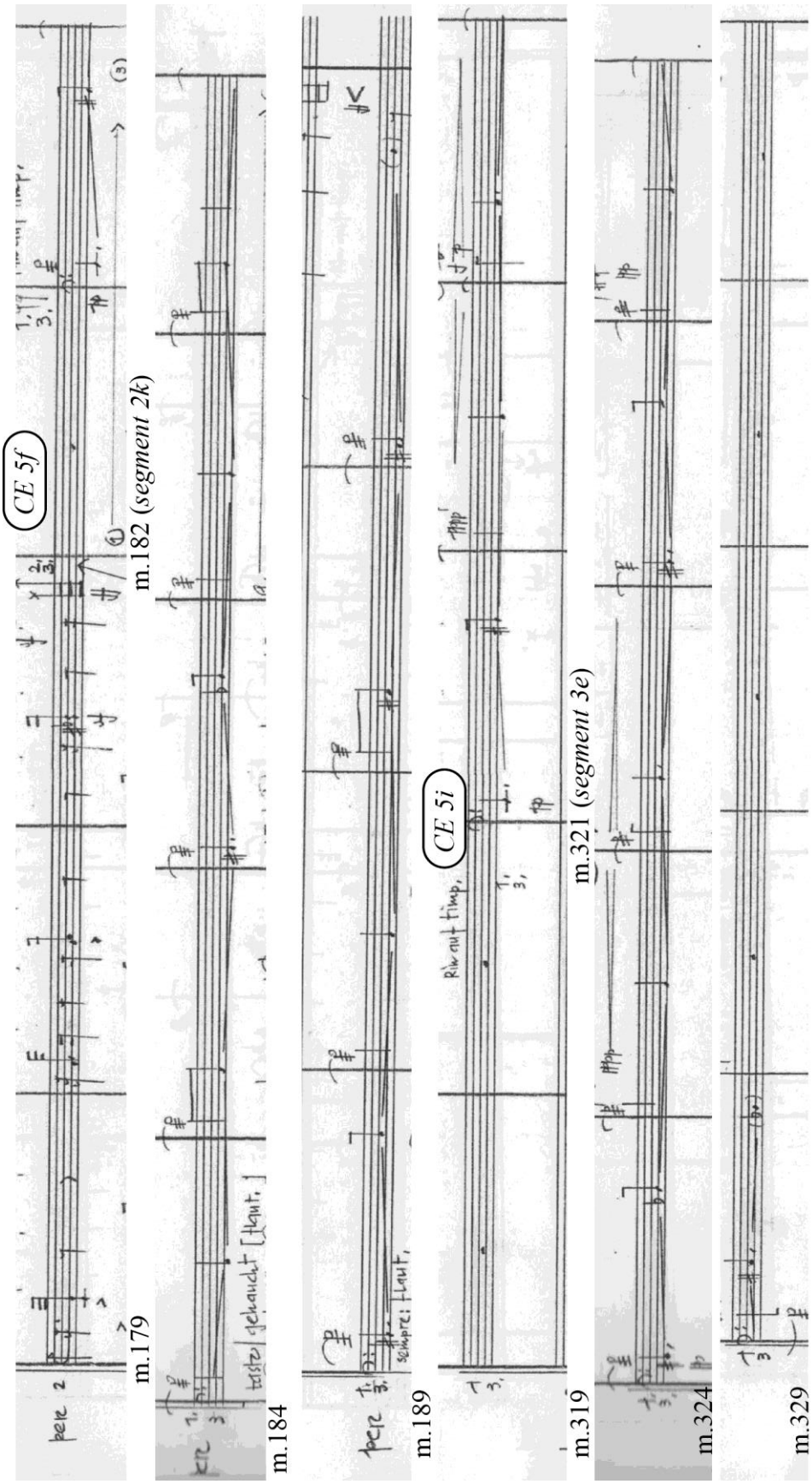


Figure 6.21: *CE 5f* and *CE 5i* in Beat Furrer's *Konzert für Klavier und Orchester*

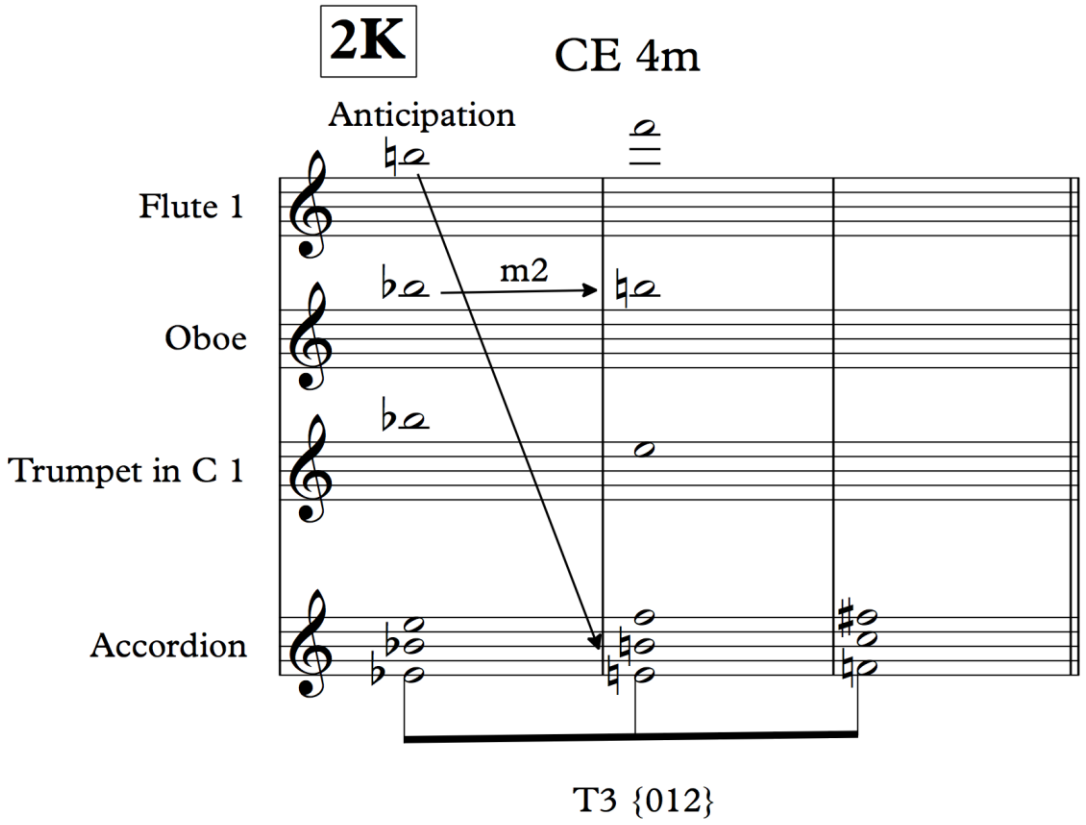


Figure 6.22: Reduction of *CE 4m* from *segment 3e* of Beat Furrer's *Konzert für Klavier und Orchester*

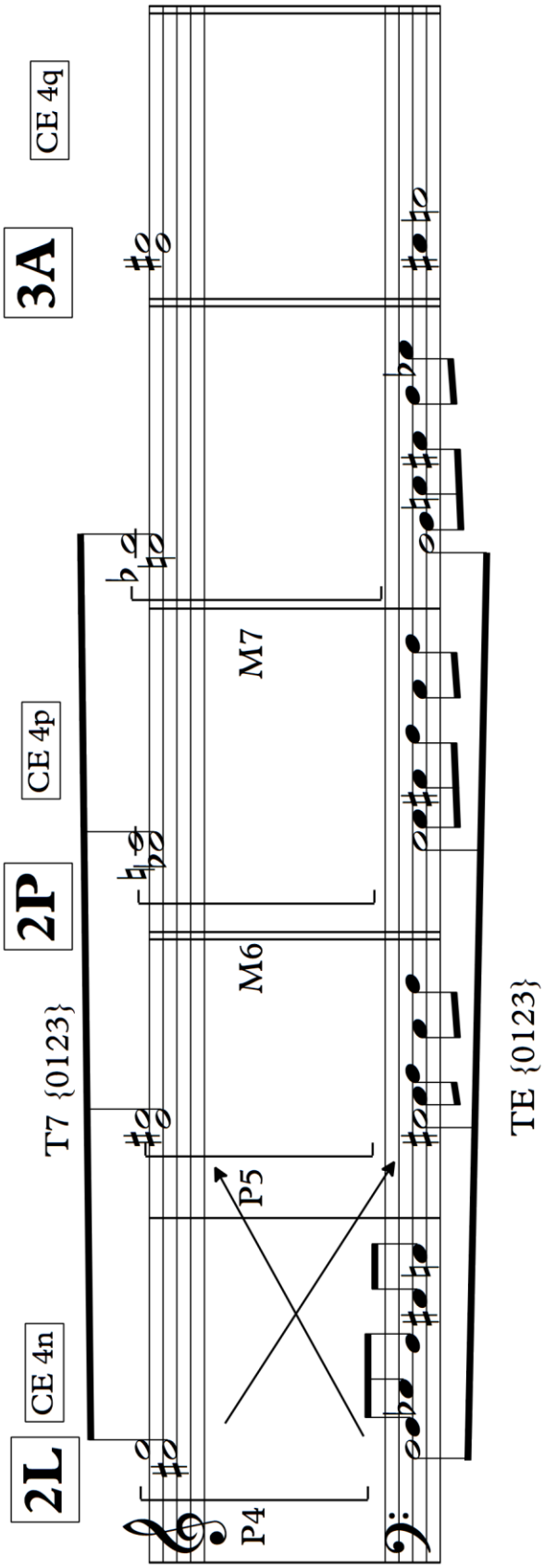


Figure 6.23: Reduction of *CE 4n*, *4p*, and *4q* from Beat Furrer's *Konzert für Klavier und Orchester*

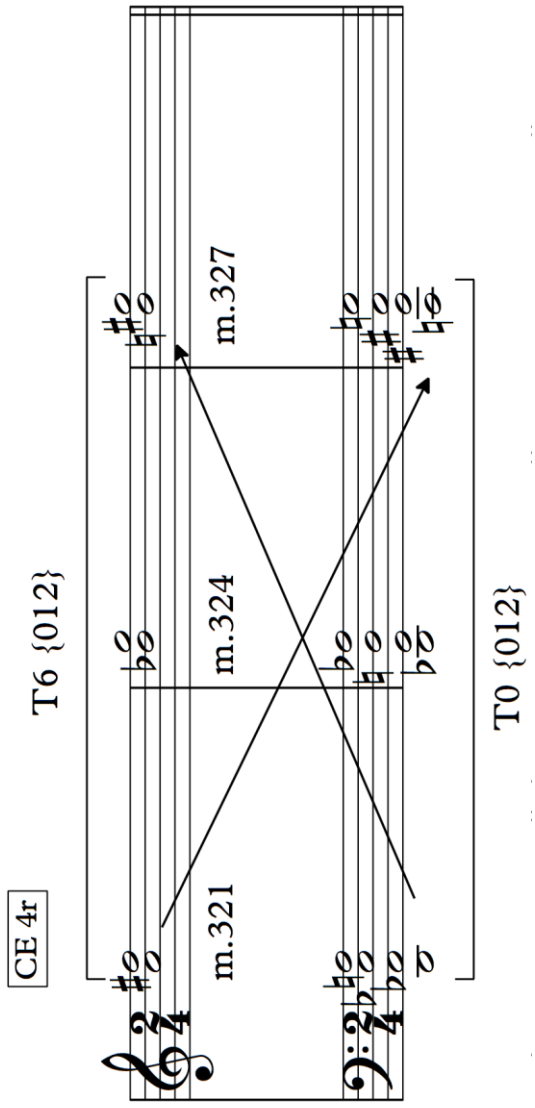


Figure 6.24: Reduction of *CE 4r* from *segment 3e* of Beat Furrer's *Konzert für Klavier und Orchester*

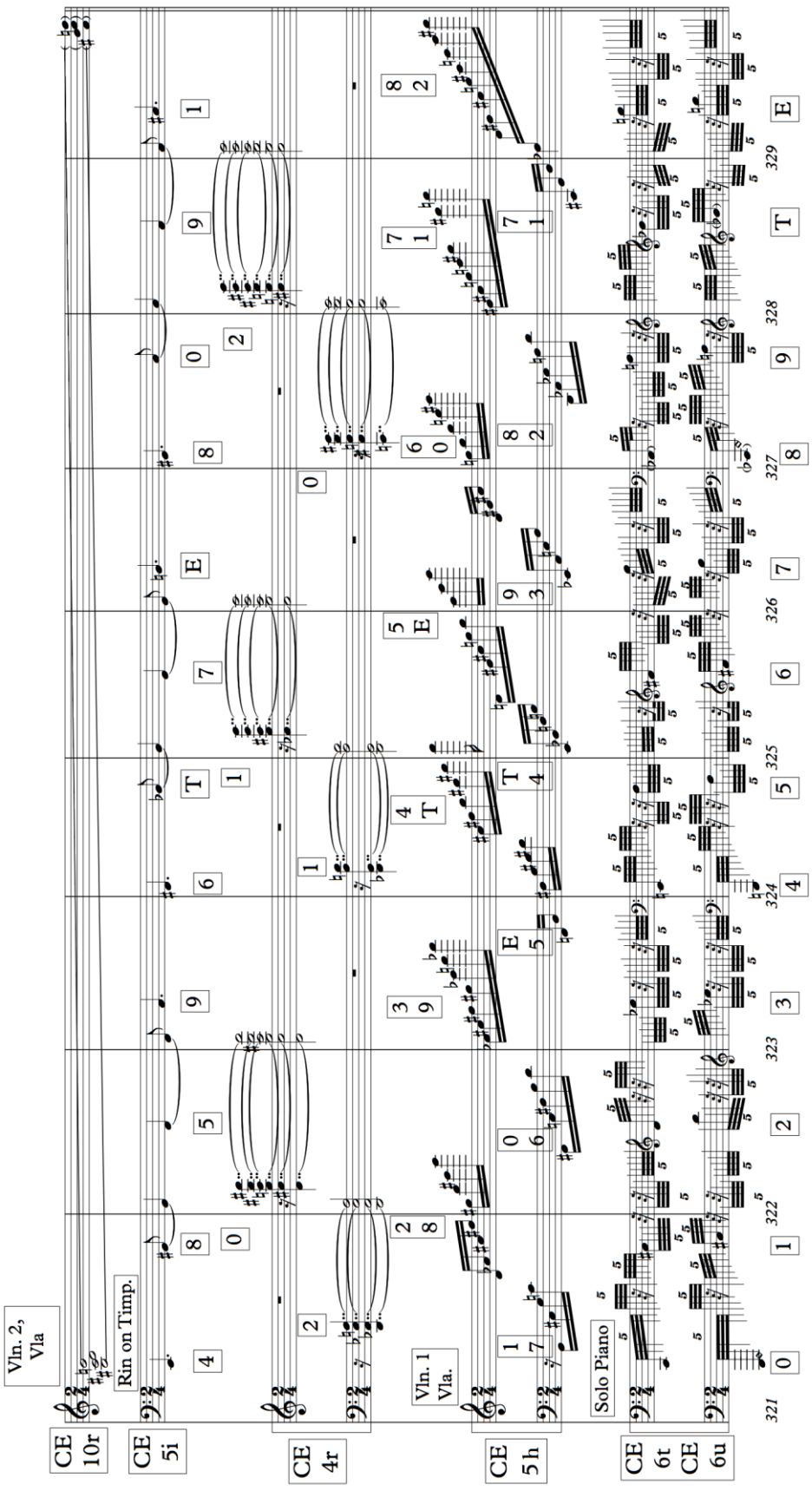


Figure 6.25: Reduction of *segment 3e* of Beat Furrer's *Konzert für Klavier und Orchester*

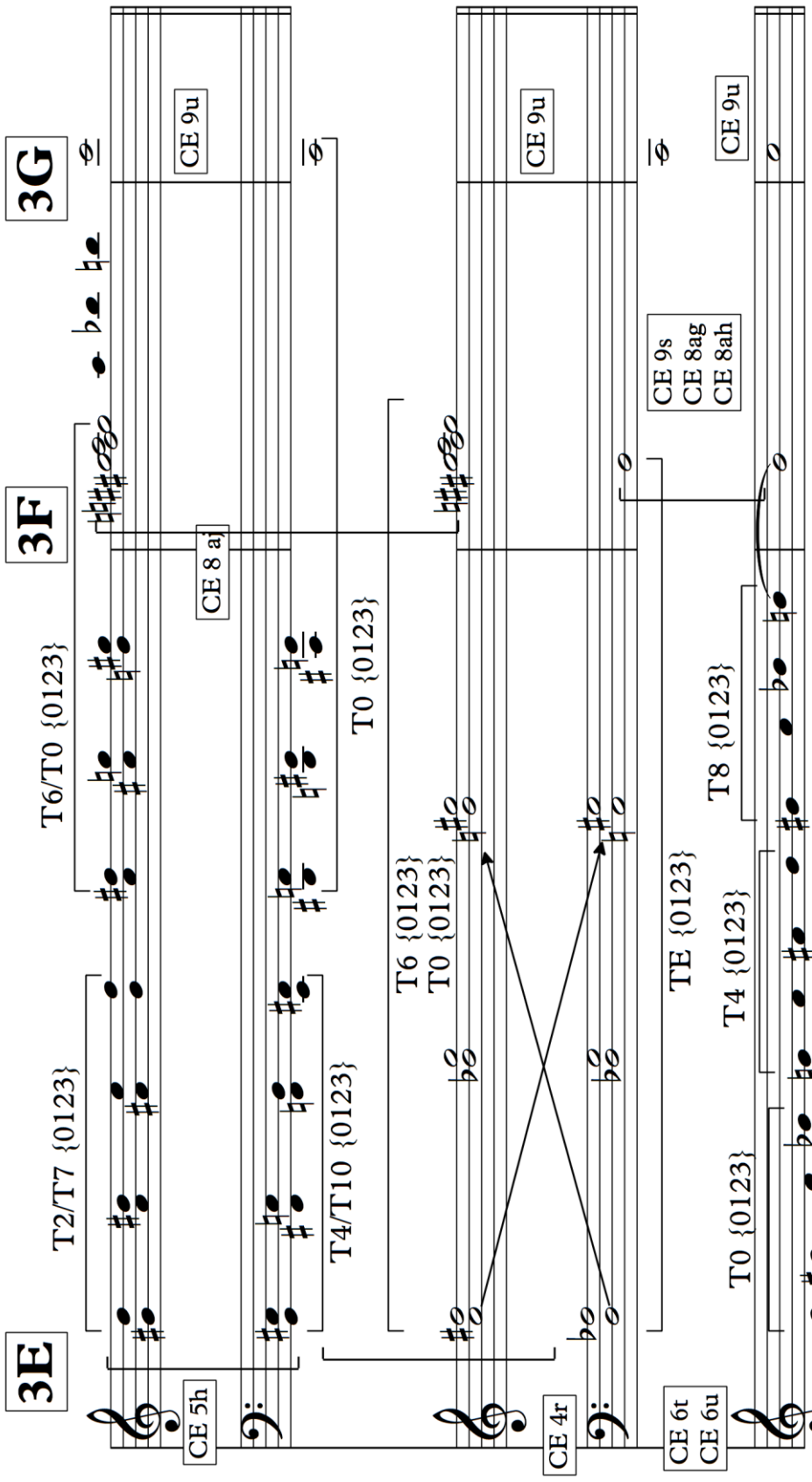


Figure 6.26: Reduction of *segment 3e*, *3f*, and *3g* from Beat Furrer's *Konzert für Klavier und Orchester*

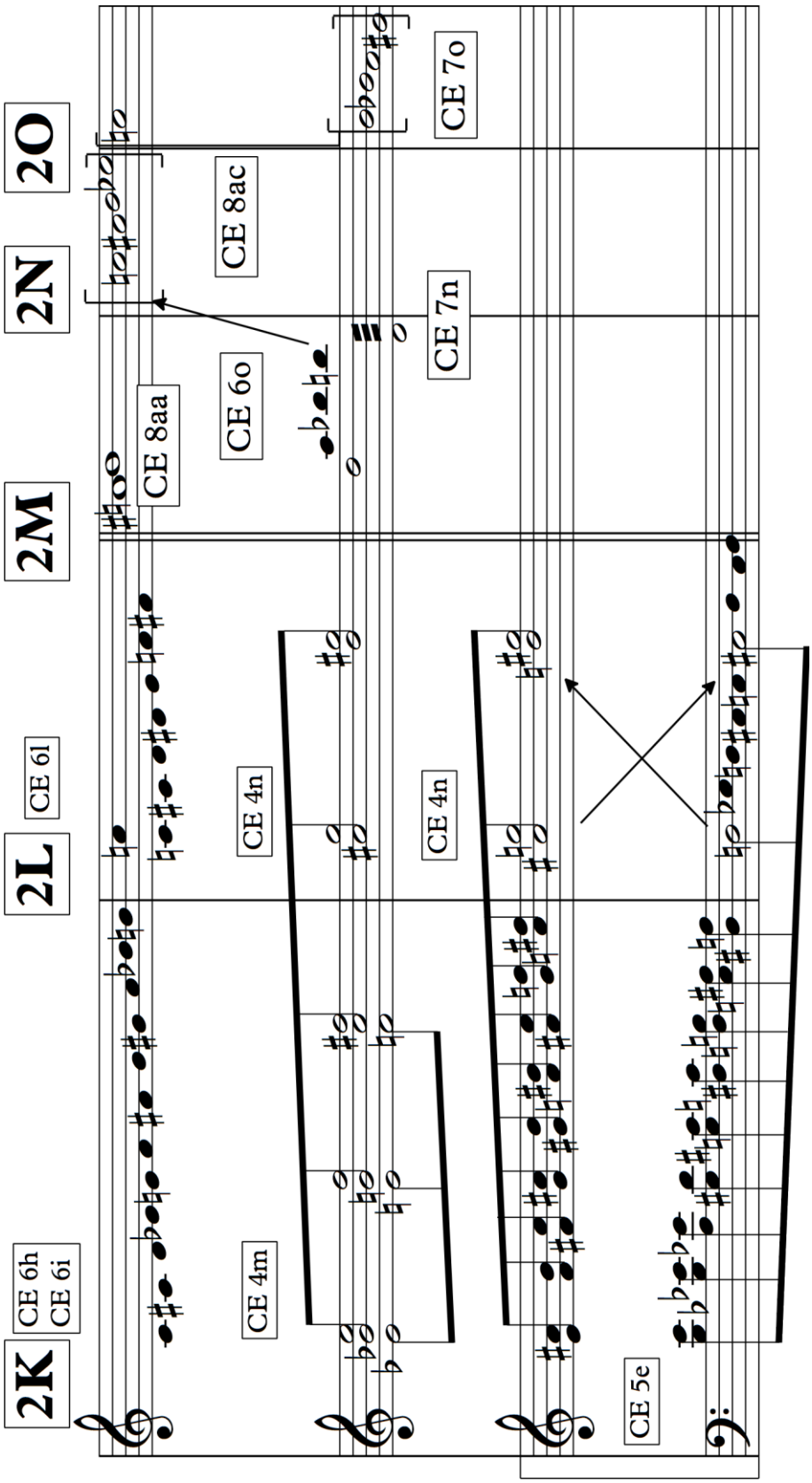


Figure 6.27: Reduction of *segment 2k* and *2l* from Beat Furrer's *Konzert für Klavier und Orchester*

CHAPTER 7

FRAMEWORK

A stepwise chromatic framework runs throughout this concerto. This framework, while important, does not necessarily imply structure or pitch-centricity. Traditional tonal expectations, like scale degree hierarchy, that can infer structure are notably absent in this composition. However, since this composition is teleological, the chromatic framework substantially contributes to climactic moments in two important ways: 1) by connecting, unifying, and informing the identity of *chromatic events* and 2) by varying the rate of chromatic ascent and descent. Pitch content *chromatic events* is a direct result of the relationship between the *chromatic event* and this chromatic framework. The variable rates of speed in the framework help to vary the longer-form pacing of this work. Throughout the concerto, *segments* are generally a similar length and each new *segment* is marked with a degree of change. This construction leads to a perceivably predictable pacing from *segment*-to-*segment*, whose potential for feeling plodding is overcome by the wildly varying rates of speed of ascent and descent contained in the framework.

Structure vs. Framework

Reductions included in this chapter only show framework. They may be Schenkerian in look and feel, but are only related to Schenkerian analysis by the shared

idea of reductive analysis. In fact, Felix Salzer compares analysis of tonal and non-tonal music in *Structural Hearing:*

> However, if compositions are definitely not within the wide tonal realm as outlined in these chapters, if they are clearly not representative of structural music, then we may ask: What is this music's constructive principle and what are the principles of its musical continuity? If it is representative of a new and different type of music not based on tonal direction, what possibilities for artistic unity and variety does it offer instead.[55]

Therefore, the reductions presented of chromatic framework should only be viewed through the lens of concepts presented in this paper, which does not engage key Shenkerian terms such as prolongation or harmonic structure.

Section 1 Framework

Figure 7.1 contains a pitch class reduction of *chromatic events* that occur in *Section 1*. These pitch classes of the *chromatic events* have been organized into a high voice and a low voice, based off general range. Open note heads represent core pitches of *chromatic events*. Stepwise closed note heads that move up or down indicate transpositions within a *chromatic event*. Repeated closed note heads indicate articulated pedals. Slurs indicate pitch classes held from one *segment* to another. Notes connected by stems represent ascending or descending lines. Figure 7.1 reveals the chromatic framework of *Section 1* and demonstrates four important attributes of this concerto: 1) nesting of minor second ascents and descents, 2) nesting of the major second ascent and descent, 3) the presence of {0123} tetrachords, and 4) the need for outside influence, specifically pitch class E, to resolve the ambiguous relationship between B and C.

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[55] Felix Salzer, *Strucutral Hearing* (New York: Charles Boni, 1952), 282-283.

Minor Second Nesting in *Section 1*

Many *chromatic events* contained in *Section 1* emphasize pitch class B and C, clearly portrayed in Figure 7.1. Minor second ascents occur often between *chromatic events* from *segment*-to-*segment.* For example, *CE 1a* and *1b* are one half step higher than *CE 1c* and *CE 1d*, demonstrating chromatic descent between nonconsecutive *segments*. The emphasized pitch class C in *CE 4a* moves up to C# in *CE 4b*, showing chromatic ascent. Figure 7.1 also shows that a *Section*-long minor second ascent occurs between *CE 1a* and *CE 4i*. There is also a switch in range between pitch class B and C. The pitch class B in *CE 1a* and *CE 1b* occurs in the lower voice, but by *segment 1o,* B has moved to an upper voice. Pitch class C occurs most clearly in *segment 1d* on C8 in the piano and moves down the low C arrival of *CE 4i*, shown in Figure 7.2.

Therefore, nesting of minor second ascent or descent is shown on the following levels, within a *chromatic event* as a gesture, from *chromatic event*-to-*chromatic event* on a *segment level,* from *segment*-to-*segment* on a *part* level, from *part*-to-*part* on a *Section* level, and from *Section*-to-*Section.* Figure 7.3 shows that the composition ends on pitch class C followed by B. Interestingly, the composition opens with emphasis on pitch class B in *CE 2a* and *CE 1a*. Later in this chapter, we will see that *S1R* arrives on C, *S2R* ends on C, and that the climax of *S3C* occurs on C and moves up to C#. Using these arrivals, a long form reduction can be made of what one could call major events of pitch centricity, Figure 7.4, which shows that the long form of the composition is comprised of minor second ascents and descents.

To further demonstrate minor second ascent or descent nesting, minor second ascent and descent are immediately demonstrated on a gestural level in *segment 1a*. The

opening dyad of *CE 2a* moves from A1 to Bb1, shown in Figure 7.5 while Figure 7.6 shows that *CE 1a* consists of a minor second descent, moving in contrary motion with *CE2a*. The contrary motion between *CE 1a* and *CE 2a* hints at the voice exchange shown in Figure 7.7.

{0123} in *Section 1*

Throughout this analysis, the {0123} tetrachord has been identified as a critical global sonority. This tetrachord has often been used to emphasize the major third symmetrical construction of the chromatic scale. The contrary motion between *CE 1a* and *CE 2a* contains T9 {0123}, showing that {0123} is immediately introduced on the gestural level of this concerto. Figure 7.1 shows that the {0123} tetrachord is also introduced over the course of the first few *segments.* The core pitches of *chromatic events* from *segments 1a – 1g* result in a T9 {0123} tetrachord. The T9 {0123} tetrachord is then used to transpose the arpeggio of *CE 3c*. Therefore, the {0123} tetrachord is used as the first transformation of *chromatic events* over the course of a *segment* in this concerto. *CE 3f* also transposes the same ostinato by a T3 {0123} tetrachord. Finally, chromatic tetrachord is also outlined by the outer voices in *segments 1a* through *1f* as they oscillate between notes of T10 {0123}.

Major Second Ascent in *Section 1*

An {0123} tetrachord can be thought of in many ways, but three are important for this composition: 1) a succession of four minor seconds, 2) two minor seconds related by a whole step, or 3) two major seconds related by a half step, shown in Figure 7.8. An

instance of T10 {0123} between *CE 1e, 3b,* and *4b* in Figure 7.1 demonstrates the third of these parsings. There is a major second descent between pitch class Bb of *CE 1e* and C of *CE 3b*. *CE 4b* contains a pitch class [B C#] dyad. When the key pitches of these *chromatic events* are combined, a T10 {0123} comprised of T10 {01} and TE {01} emerges.

This parsing is important since major second ascent is the closest thing to a motive in this composition. A major second ascent occurs in the climax of *Section 1 Call* as well as the related material in *segments 3a* and *3b*, shown in Figure 7.9. PCo 1 is also comprised of a major second transposed by half step, shown in Figure 7.10. The major second also concludes the composition with the pitch class A to B ascent in the crotales, shown in Figure 7.11.

Pitch-class E in *Section 1*

As demonstrated in Chapter 5, pitch class E resolves the ambiguity between B and C in *Section 1.* Figure 7.1 shows a little more clearly how pitch class E is established in *Section 1*. Pitch class E is first introduced in *CE 1k* and *1l* in *segment 1j*. Pitch class E is reinforced when *CE 3e* begins on pitch class C and transposes up to E in *segment 1k*. The voice exchange of *CE 5b* that helps establish E in *segment 1n* is not shown, since it was demonstrated earlier. This reduction shows a different view, where a quasi-tritone resolution occurs between the top voice of *CE 5b* and *CE 9c* and *7c*. The pitch class [B F] tritone resolves to a [B C E] sonority, projecting a variant of a normal tonal tritone resolution: B – C and F – E. By *segment 1p*, only three essential pitch classes remain in play in the framework: C, B, and E, whose relationship has been previously discussed.

As shown in Chapter 5, B is finally absorbed into the harmonic series of E with the descent of *CE 4h* rather than resolved.

Section 2 Framework

While *Section 1* introduces the key attributes of this composition, these ideas are developed further in *Section 2*: 1) half step motion becomes chromatic ascent and descent 2) tritone parsing of the chromatic scale compliments the {0123} tetrachord, and 3) multiple cycles of the chromatic scale move at extremely different rates of speed, varying the content of the *chromatic events* that they connect. These three attributes work hand in hand to realize the climax of *Section 1*. Therefore, examining how the climax of *Section 2* is realized will further demonstrate how the chromatic framework functions.

Figure 7.12 is a reduction of *Section 2* that uses the same representations as Figure 7.1 with the following additions: "[]" contain vertical sonorities, but are written out as linear pitches for ease of identification and the tremolo indicates the piano's attempt to perform a sustained pitch in *CE 7h*.

The climax of *Section 2 Call* occurs in *segment 2o* and consists of vertical piano sonorities with a strong sense of pitch class C, *CE 7o*. *CE 7o*, without context, cannot project a sense of centricity, as it contains a clustered pitch collection. The sense of pitch class C in *CE 7o* comes from the expectations set up by a preceding event, *CE 7h*, shown in Figure 7.13. *CE 7h* is scored in quadrupled pitch class Eb octaves, colored by pitch class E and D in the winds. The octave doubling of this *chromatic event* clearly sets the expectation that pitch is an important component to all articulated piano pedals. Therefore, when *7o* happens, it is understood as a pitch class C arrival occurring in the

wake of a long-term ascent, despite its clustered content.

Chromatic framework, ascent and descent, contributes to the climax of *Section 2, segment 2o*. These ascents and descents are key to arriving on pitch class C in *segment 2o*. Two chromatic descents occur in *Section 2 Call*. The first one occurs from *segment 2a – 2e* and is highly obscured. The masked character of this descent again demonstrates that initial *chromatic events* within sub-groups are highly varied. The second descent in *Section 2 Call* begins at the end of the lower voice ascent of *CE 6g* on pitch class C and continues downward to B in *CE 2p*, which helps to establish the beginning of *Section 2 Response.* The arrival of the descent occurs after the climax of *Section 2 Call*, not with it.

These descents are the only complete descents in the composition and show that the use of descent changes throughout the piece. The first descent in the composition is in *CE 4a*, a nonchromatic descent. The second descent occurs between four events as a T9 {0123} tetrachord and is chromatic, but obscured, while the third is overt and important for establishing the first pitch of *Section 2 Call* but offset from the climax of *Section 2 Call*.

Ascent also plays a role, as three chromatic ascents occur in *Section 2 Call* and converge on C in *segment 2o*. Ascent 1, shown in Figure 7.12, begins with *CE 7f* in *segment 2a*. *CE 7f* begins on pitch class C# and rises to D in *CE 7g* in *segment 2l*. Ascent 1 then descends down through pitch class C# in *segment 2n* to arrive on C in *segment 2o*. Ascent 2 begins in *segment 2e* on pitch class C of *CE 6d* and ascends to pitch class D in *CE 2h*. This ascent resumes in *CE 4m* on pitch class Eb and continues rising to C in *segment 2n* and suspends into *segment 2o*. While the Ascent 1 overshot C and returned back to it, the Ascent 2 arrives too early and waits. Ascent 3 begins in

segment 2k with *CE 6h* and *6i.* This third ascent rises up to pitch class D and turns back around to C in *segment 2o* through C# in *segment 2n*.

Ascent 1 and Ascent 3 arrive on pitch class D before the climax of *segment 2o* and must turn around, demonstrating asynchronicity between the pitch apex of the ascents and the climax of *Section 2 Call*. The pitch class D in *CE 7n* emphasizes this offset and is a musically irreverent take on the relationship between the solo piano and the ensemble, shown in Figure 7.14. *CE 7n*, presented by the ensemble piano, is the first instance of either piano trying to imitate or emulate the sustained notes in the winds. It is an overtly projected sound in *segment 2m*.

Up until this point, the solo piano had been participating in Ascent 1, then initiated Ascent 2 and Ascent 3. After the voice exchange between pitch class C# and D in *segment 2l,* which further emphasizes D, the ensemble piano presents *CE 7n*. *CE 7n* "calls" to the solo piano to abort the ascent and join the descending line, which it does. This abstract "call and response" is the first indication that climax in s*egment 2o* is a frustrated climax, as the overall pitch progression from *segment 2l* to *2o* returns back down to pitch class C rather than ascending to climax.[56]

The climax of *segment 2o* also represents the pitch arrival of *Section 2 Call*. All three ascents have collapsed into pitch class C, while a final incomplete ascent begins up to E. Since the descent ends on pitch class B, the ambiguity of C, E, and B is present at the end of *segment 2p. Section 2* resolves the ambiguity between the three pitches with the long scale minor second ascent from pitch class B to C in *Section 3 Response*

[56] There is a higher presentation of pitch class Eb in 2n, in the winds, part of an articulated pedal structure T0 [0123] vertical trichord, which leads to the true apex of the pitch ascent, *segment 2p*. So, what we have here are three ideas, climax, piano pitch apex, ensemble pitch apex, and reconciliation of two conflicting ideas, ascent and descent.

described in Chapter 4.

Section 3 Framework

Section 3 does not introduce any new concepts in terms of chromatic framework. Instead, it uses elements introduced in *Section 1* and *Section 2* with more refinement in order to realize the climax of the composition in *segment 3h*. Figure 7.15 is a reduction of *Section 3* that uses the same representations as Figure 7.12 and Figure 7.1.

Section 3 Call begins with rising major seconds in the upper voice of *CE 4q*, developing the major second climactic moment of *Section 1*. The major second ascent in *segment 3a* to *3b* when combined with *segment 3c* to *3d* emphasizes the {0213} motive from PCo 1. The ascent in *segment 3a* begins on Ab and arrives on pitch class C in *segment 3b*. The lower voice descent of *CE 4q* contains a TE {012} trichord that arrives on a pitch class [B C] dyad in *segment 3b*. *Segment 3a* also contains *CE 7q,* which echoes *CE* 7n. The tremolo D4 of *CE 7q* occurs in both the ensemble piano and the solo piano, shown in Figure 7.16, representing a point of agreement between the ensemble and the solo piano. *CE 7q* also sets up the idea that the climax of the composition is realized by ascent and descent together. *Segment 3d* includes a pitch class C# signaling a possible further ascent but when combined with the B in *segment 3f*, ends up functioning similar to double neighbor motion, seen throughout the concerto. Realizing a true compositional requires more emphasis on the arrival, so all ascents and descents converge on C by *CE 3h* in order to fully accentuate the climax at *segment 3h*.

Since *segment 3g* contains material similar to the climax of *Section 2*, the *chromatic events* contained in *3g* as well as the preceding and following *segments* must

be transformed to fulfill a new function. *Segment 3f* ascends and expands, similar to *segment 2n*, but instead of arriving on the next section, it arrives on pitch class C two measures before *CE 3g*, weakening the effect of the high piano chords, shown in Figure 7.17. Additionally, the pedal emphasizes a T10 [0123] in *segment 3g* rather than a T7 [0123] tetrachord in *segment 2o.* This pitch collection emphasizes the dissonance of pitch class B and C# against the high C pedal, creating a more unstable sonority.

CE 4s contains the climax of the composition and immediately follows *segment 3g*. Figure 7.18 demonstrates that the climax utilizes the chromatic connections outlined earlier in this paper. Also, Figure 7.19 demonstrates that the climax is the reverse of the major chords separated by tritones in *CE 2a*, making *segment 1a* pre-referential to the climax of the entire composition. This climactic moment rises in pitch to the C#, but the ensemble moves in contrary motion, leaving room for the high hammered piano chords in measure 349 that refer back to the solo piano material in *segment 3c.* Pitch class C# descends to C but rises in range again, intensifying the climactic moment which is actually a descent to pitch class B, interrupted by a rude Bb signaling the end of the climax. While this pitch class Bb triggers the descent in the ensemble, the solo piano remains stuck in the material of the climax, unable to snap out of it for the rest of the composition. The concerto concludes with *CE 4t*, a stepwise nonchromatic descent that accounts for one full pitch class loop over the course of three descents. The ensemble piano descent that follows, *CE 1t*, is a chromatic descent with an occasional note substituted with a rest.

Summary

Furrer's seemingly blasé attitude towards projecting the perception of the chromatic rigor in construction of this composition indicates that his rigor is serving a function other than perception. In one view, the chromatic framework simply acts as scaffolding for the *chromatic events* to hang on, neutral towards structural relationships. Therefore, potential obscurity of chromatic framework and direct awareness of it are equal possibilities in this composition and are dependent on the *chromatic event* that realizes that particular moment in the framework. For instance, the voice exchange in *CE 5b* that is so critical for the establishment of the E pedal in *CE 8a* in *S1C* is completely obscured by the surrounding musical texture, shown in Figure 7.20. The framework is clear between *CE 5b* and *CE 9c* in the reductions, but the scale of perceptibility is not conveyed.

This structural freedom is actually a form of development throughout the concerto. The neutral attitude of the framework helps to organize the highly contrasting material of the composition. For instance, if all *chromatic events* involved in the framework of this composition were assigned similar compositional weight, the concerto would run the risk of projecting an uninteresting middle-ground, musically handcuffed by the stasis inherent in the ascent or descent of the chromatic scale. The change in comprehensibility from *CE 5e* to *CE 4n* from *segment 2k* to *2l*, shown in Figure 7.21, represents a pertinent example of this shift of scale. *CE 5e* is barely perceptible in *segment 2k* yet it passes its chromatic descent to the dominant musical material in *CE 4n*.

Since this analysis is essentially about the idea of identity through iteration of loops, the reductions aspire to demonstrate that ascending or descending pitch class loops

occur at differing rates of perceptibility, importance, and speed. Figure 7.1, 7.12, and 7.15 clearly show that more than a dozen ascents and three or four complete or partial descents occur over the course of the concerto, further strengthening my proposed *work-idea* of this concerto.

Finally, chromatic reductions demonstrate a progression of use of the chromatic framework *itself* over the course of the composition. *Section 1* uses the framework to introduce core aspects of the composition, like half step motion. *Section 2* uses these aspects to realize climactic moments. An example of this would be the transformation of half-step motion into a number of chromatic ascents that contribute towards realizing or presenting climactic moments. *Section 3* utilizes the attributes introduced in *Section 1* in order to realize the climactic moment of the composition. The chromatic ascents and descents line up in *Section 3* with the pitch class apex of the composition. Therefore, the framework is in its own loop pattern similar to the *chromatic event* transformation loop of introduction, use, and refinement. Loop 1 introduces important attributes of the composition, Loop 2 uses them, and Loop 3 refines them.

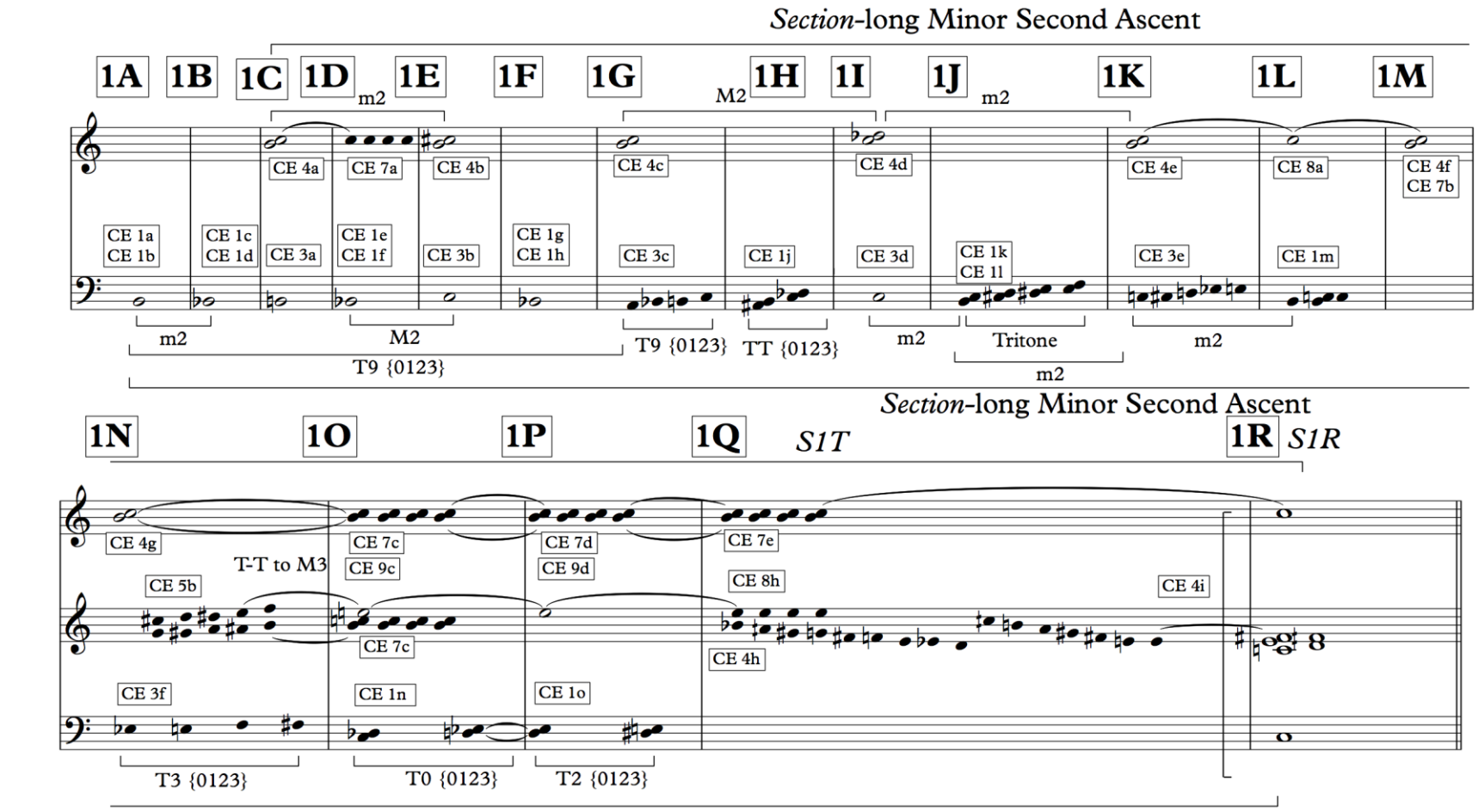


Figure 7.1: Reduction of *Section 1* of Beat Furrer's *Konzert für Klavier und Orchester*

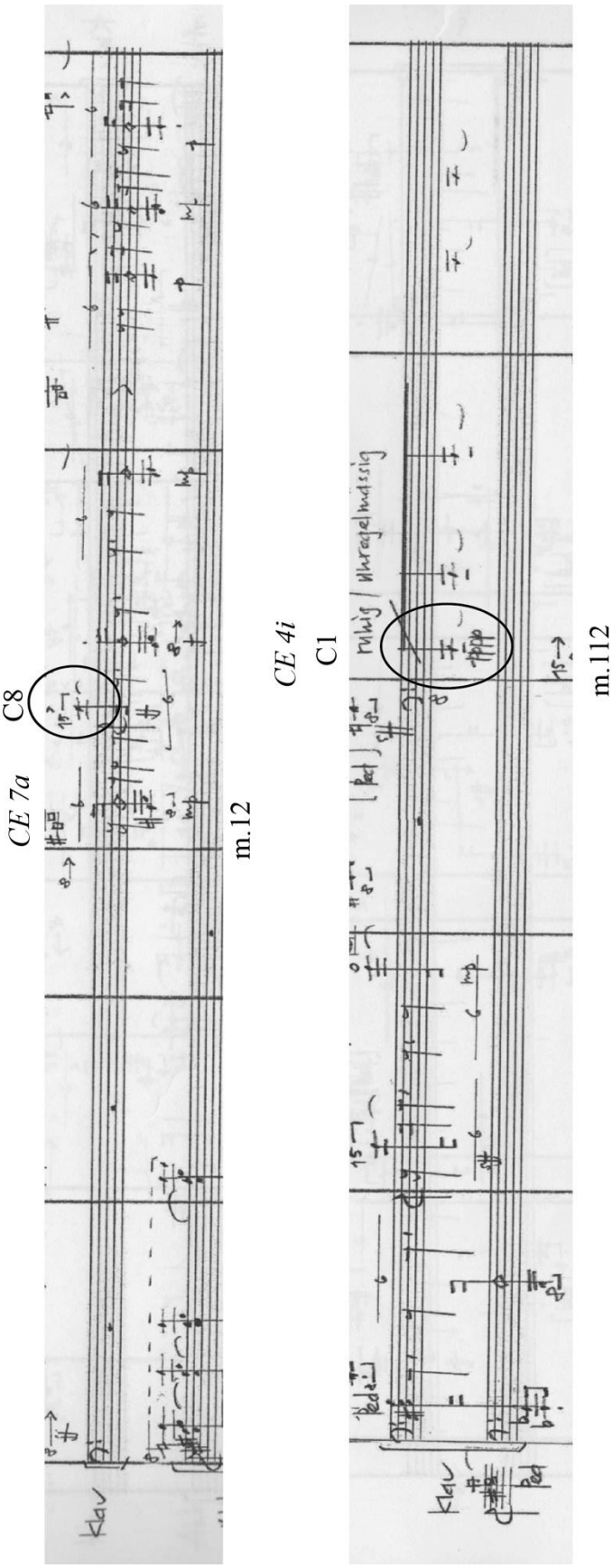


Figure 7.2: Range shift of pitch class C over *Section 1* of Beat Furrer's *Konzert für Klavier und Orchester*

(DESCENT II).....

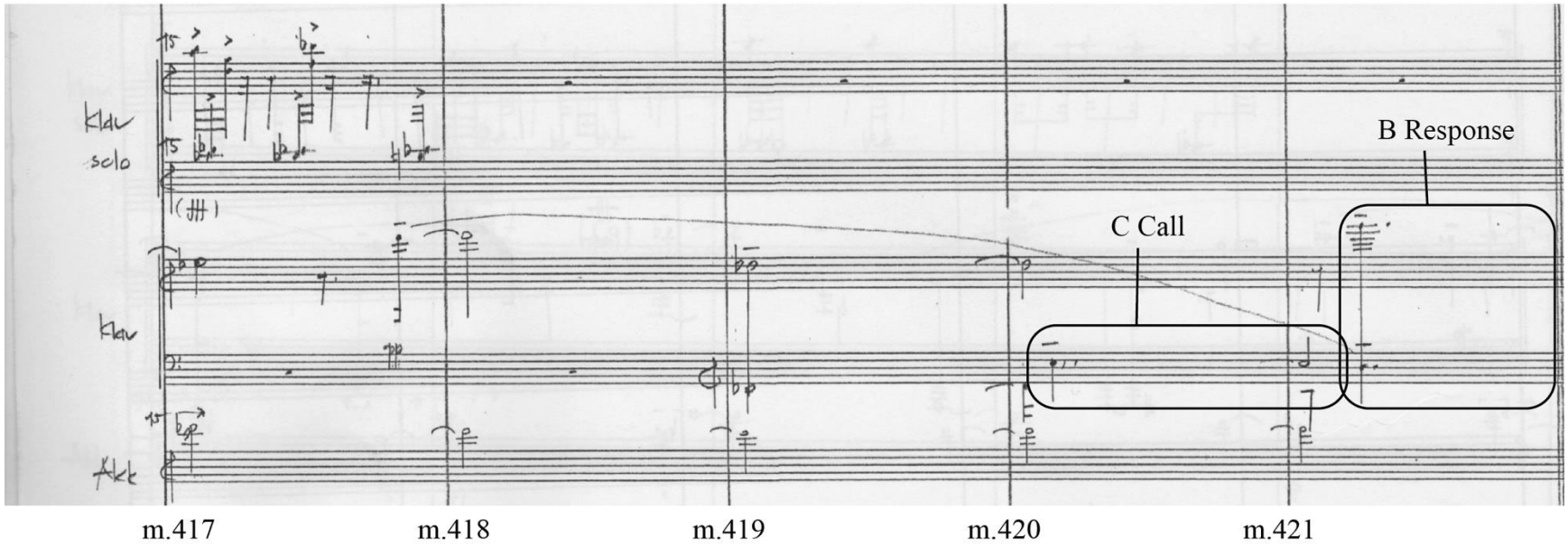


Figure 7.3: Final two pitches played by the solo piano in Beat Furrer's *Konzert für Klavier und Orchester*

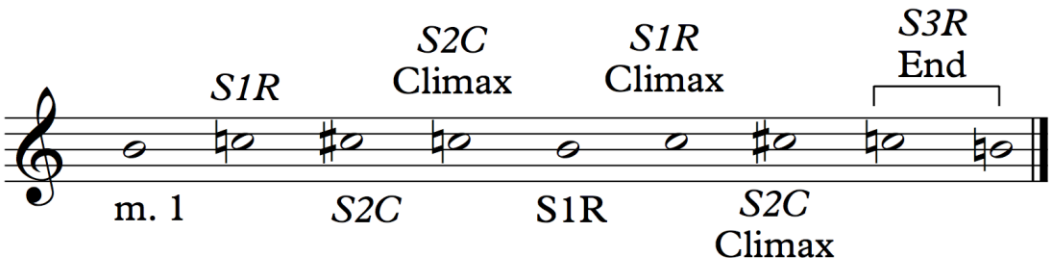


Figure 7.4: Long form of Beat Furrer's *Konzert für Klavier und Orchester*

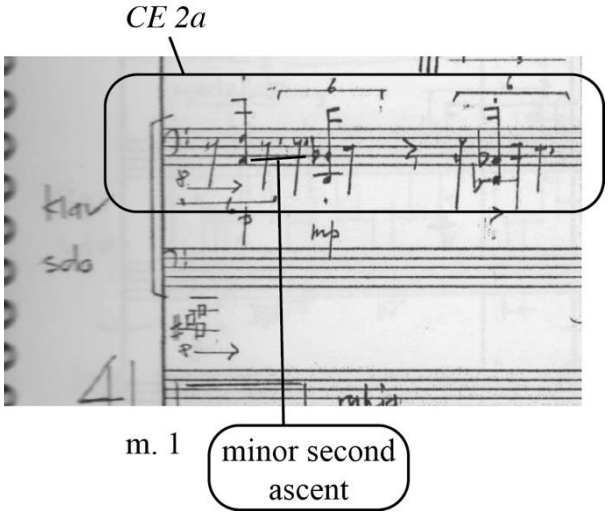


Figure 7.5: Minor second ascent in measure 1 of Beat Furrer's *Konzert für Klavier und Orchester*

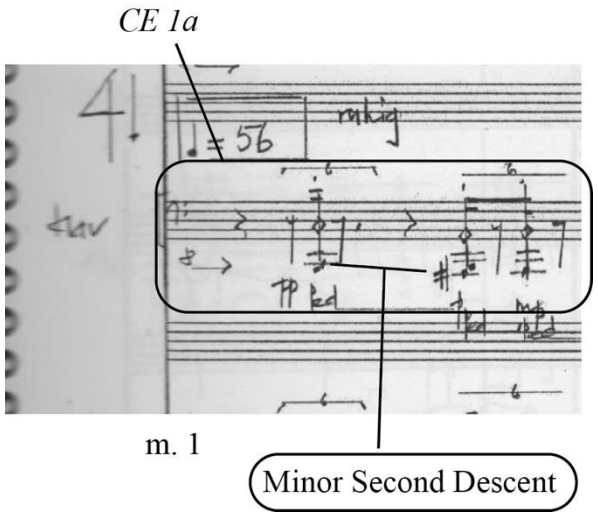


Figure 7.6: Minor second descent in measure 1 of Beat Furrer's *Konzert für Klavier und Orchester*

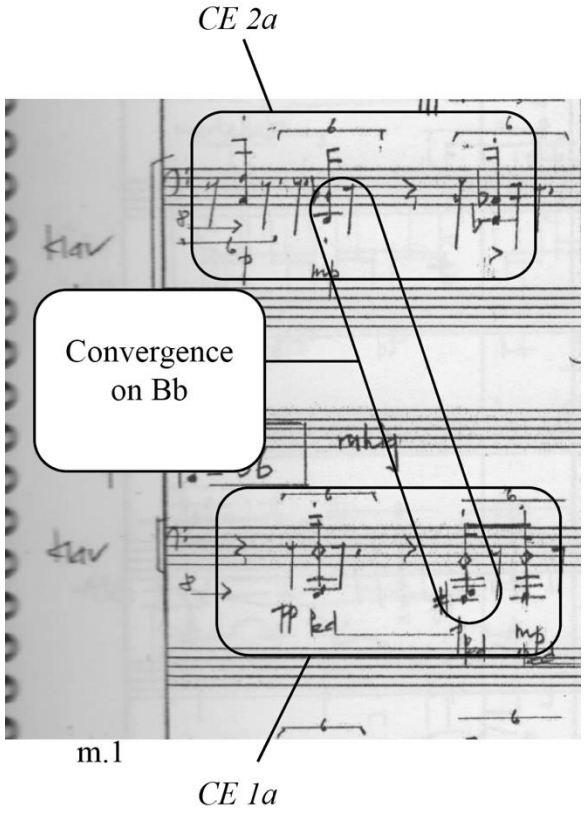


Figure 7.7: Voice convergence in measure 1 of Beat Furrer's *Konzert für Klavier und Orchester*

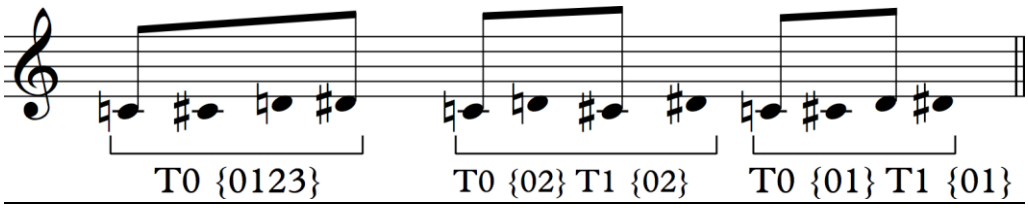
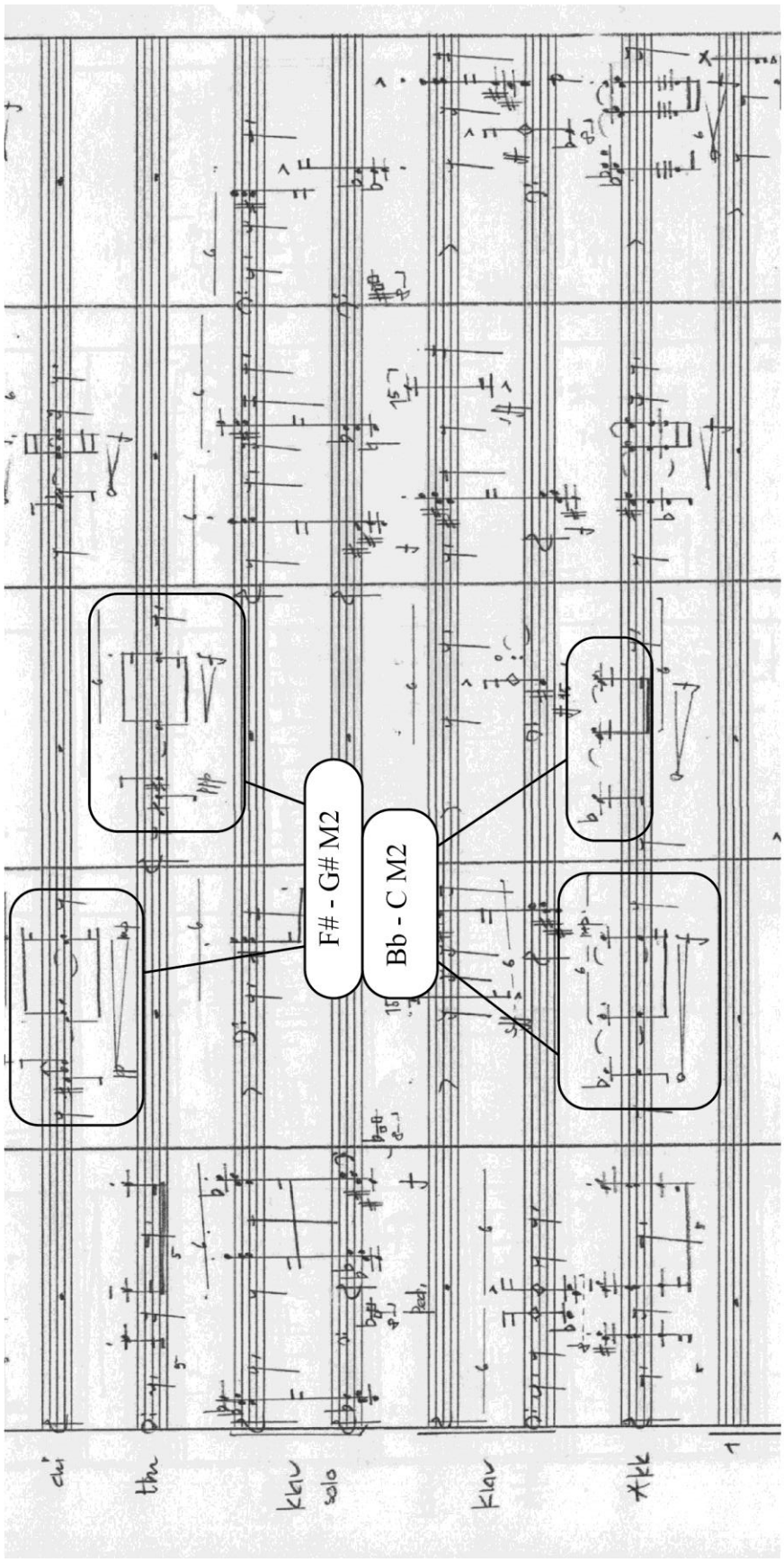


Figure 7.8: Three parsings of the {0213} tetrachord used in many pitch collections in Beat Furrer's *Konzert für Klavier und Orchester*



m. 90 (*segment 1p*)

Figure 7.9: Major second motive in the *segment 1p*, 3*a*, and 3*b* of Beat Furrer's *Konzert für Klavier und Orchester*

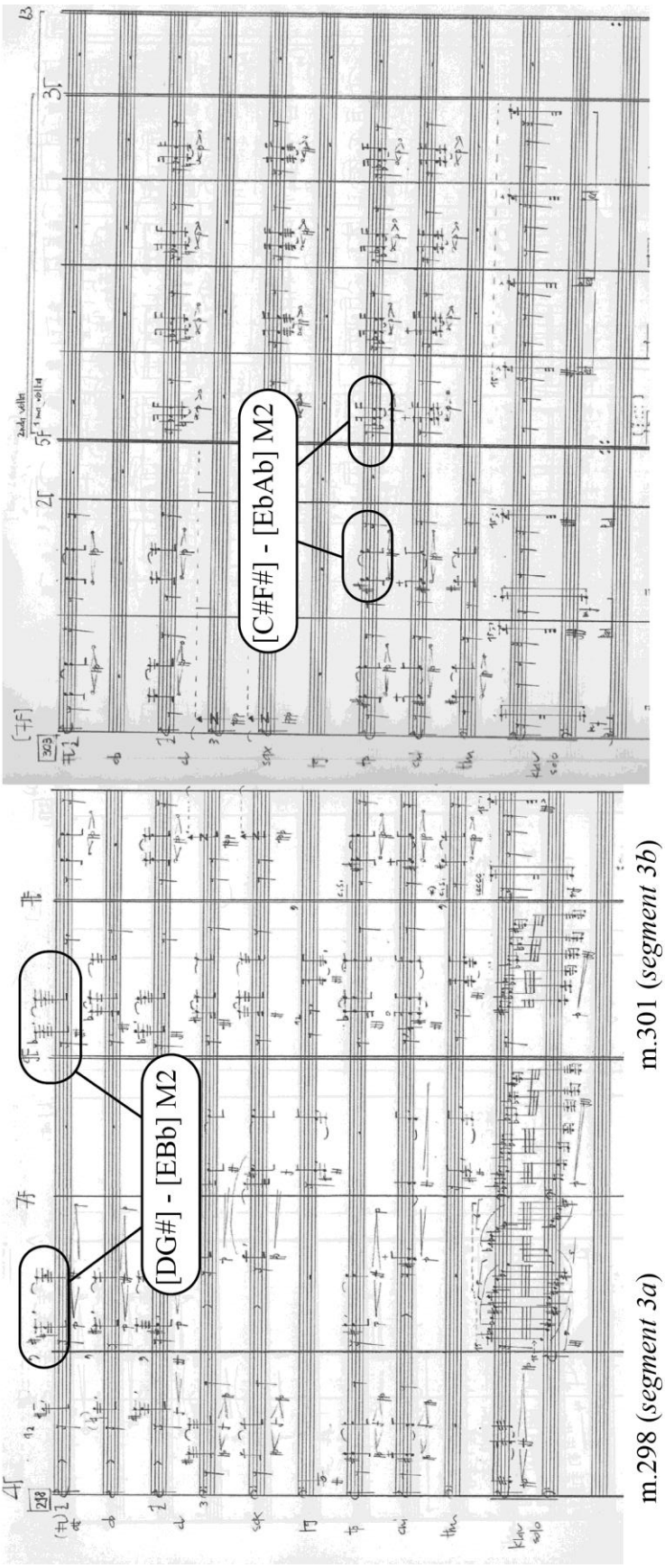


Figure 7.9 (Continued)

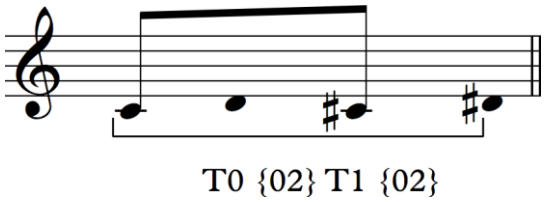


Figure 7.10: Major second motive in PCo 1 of Beat Furrer's *Konzert für Klavier und Orchester*

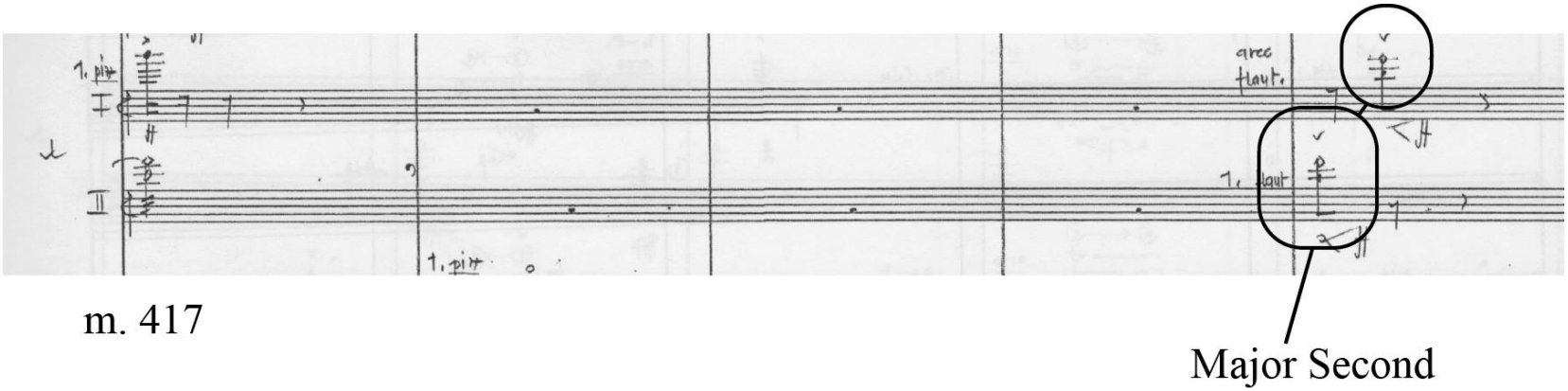


Figure 7.11: Major second motive in the last measure of Beat Furrer's *Konzert für Klavier und Orchester*

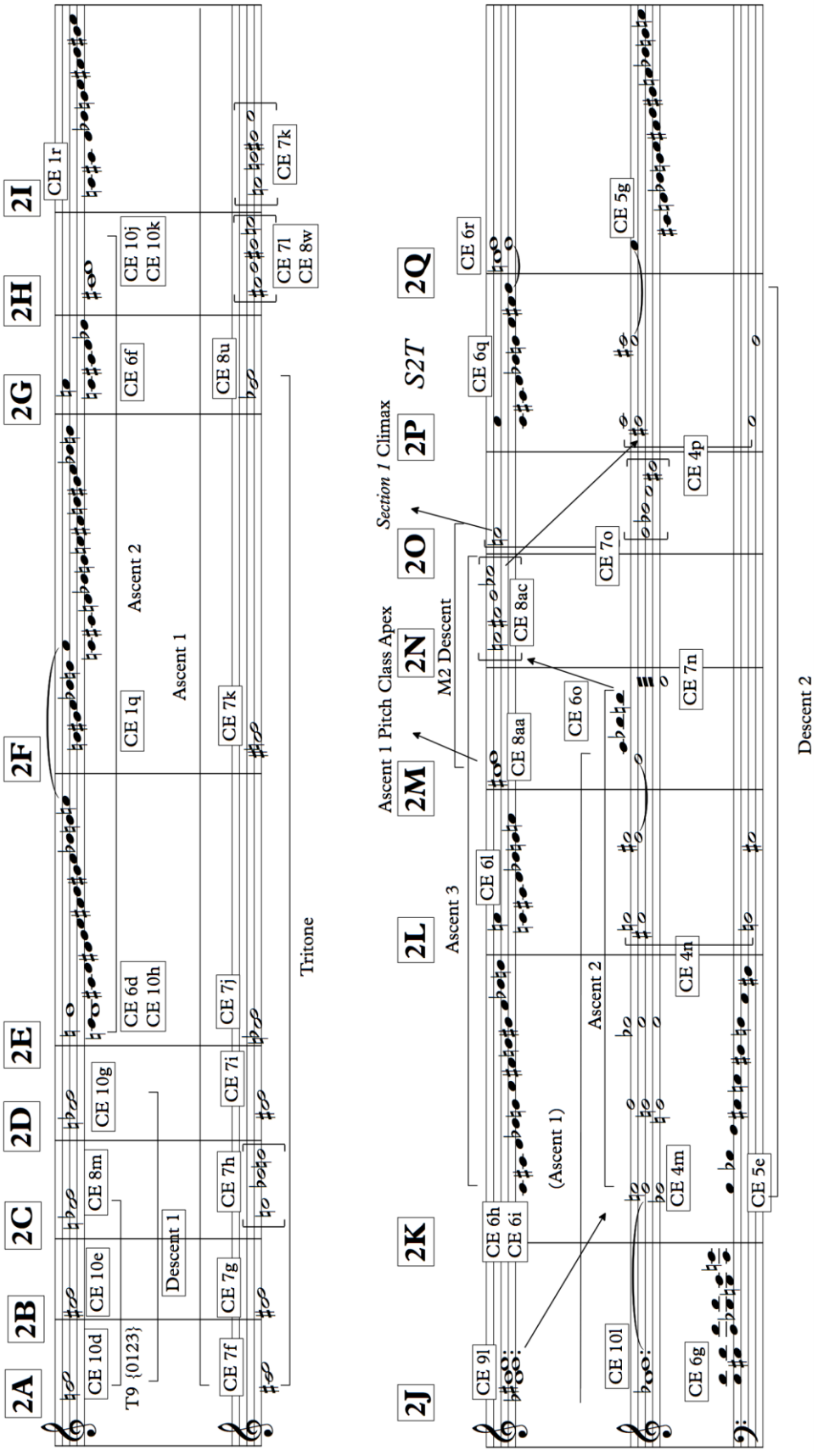


Figure 7.12: Reduction of *Section 2* of Beat Furrer's *Konzert für Klavier und Orchester*

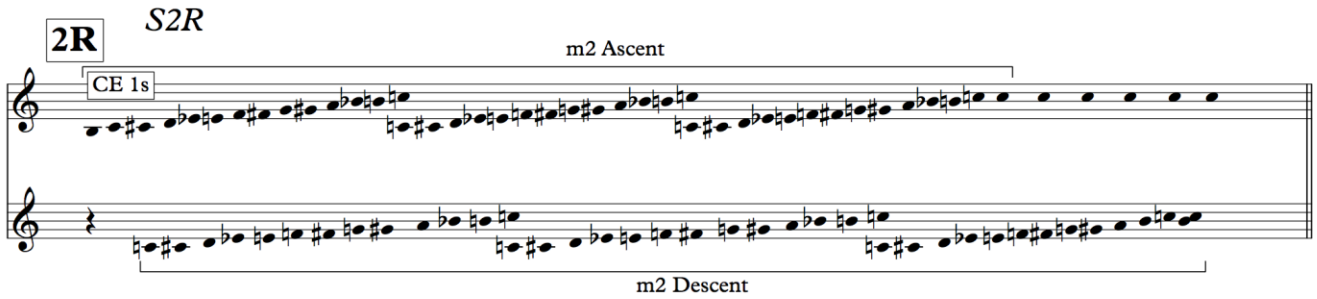
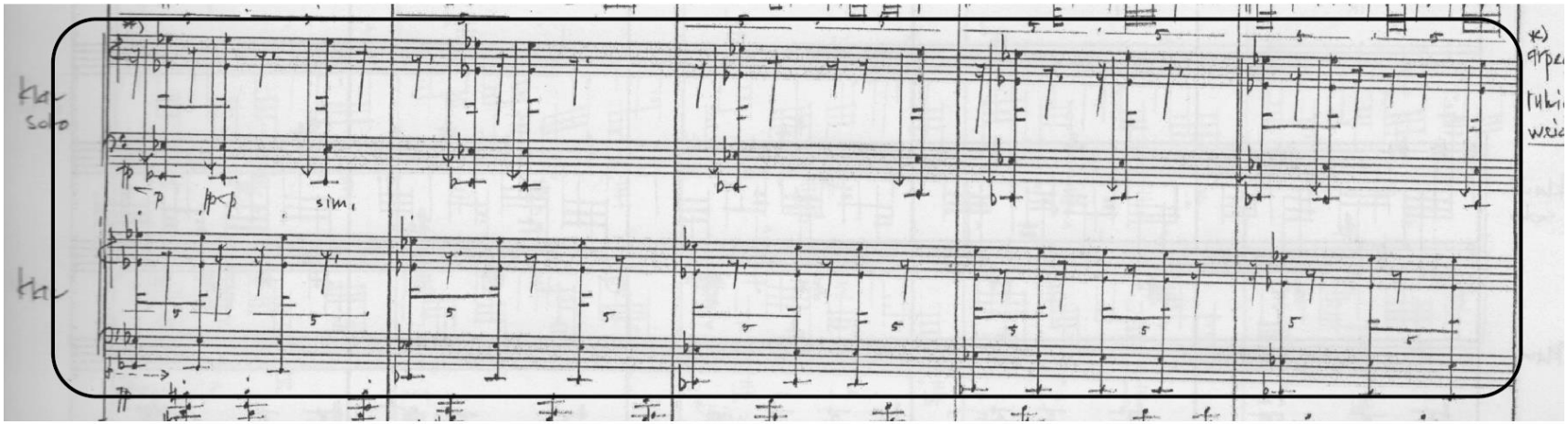


Figure 7.12 (continued)

CE 7h



m. 134

Figure 7.13: *CE 7h* from Beat Furrer's *Konzert für Klavier und Orchester*

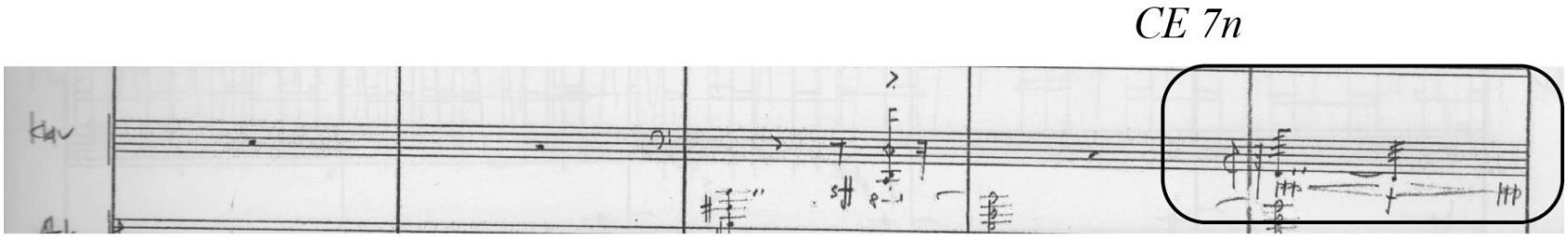


Figure 7.14: *CE 7n* from Beat Furrer's *Konzert für Klavier und Orchester*

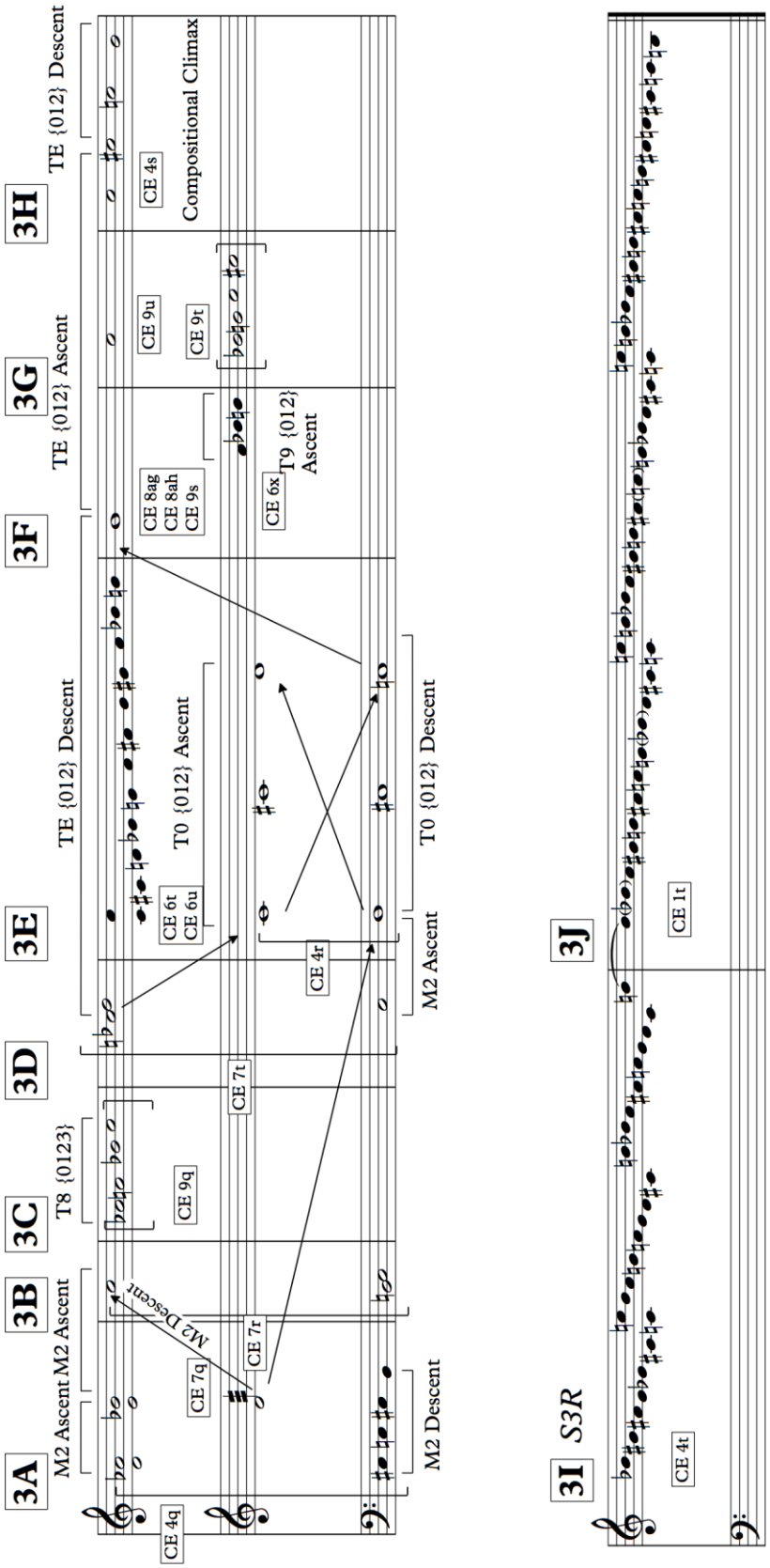


Figure 7.15: Reduction of *Section 2* of Beat Furrer's *Konzert für Klavier und Orchester*

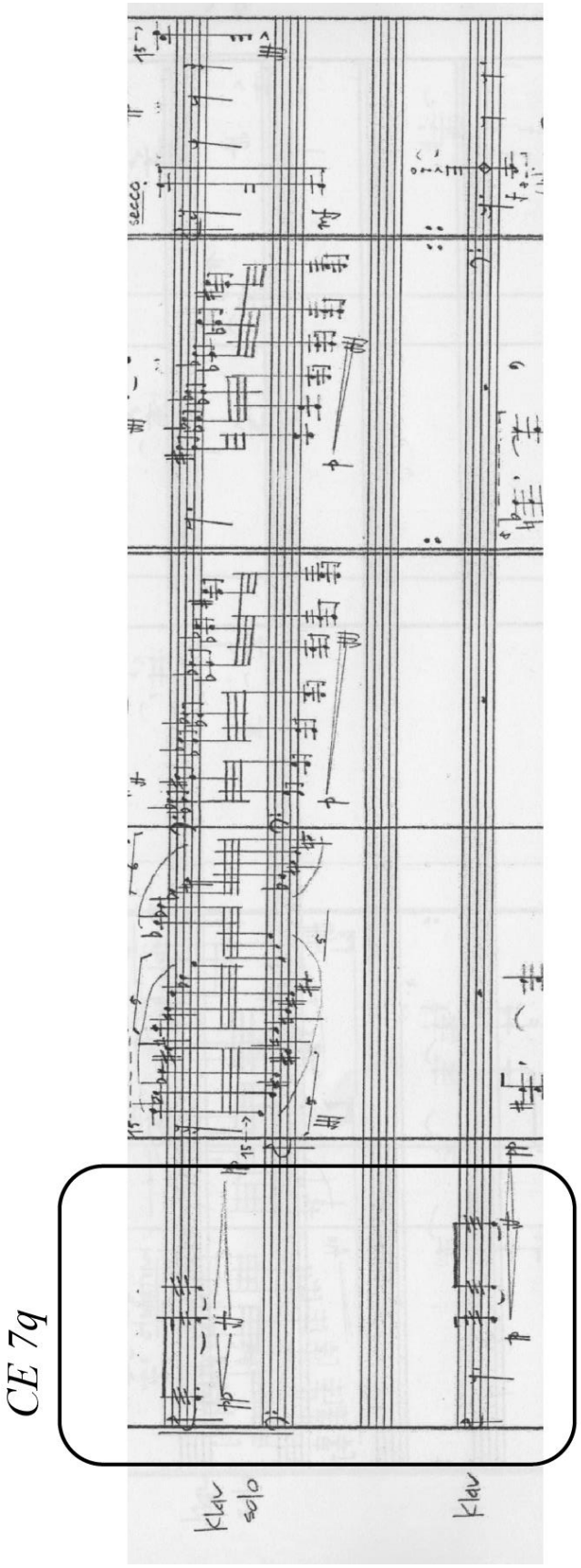


Figure 7.16: *CE 7q* from Beat Furrer's *Konzert für Klavier und Orchester*

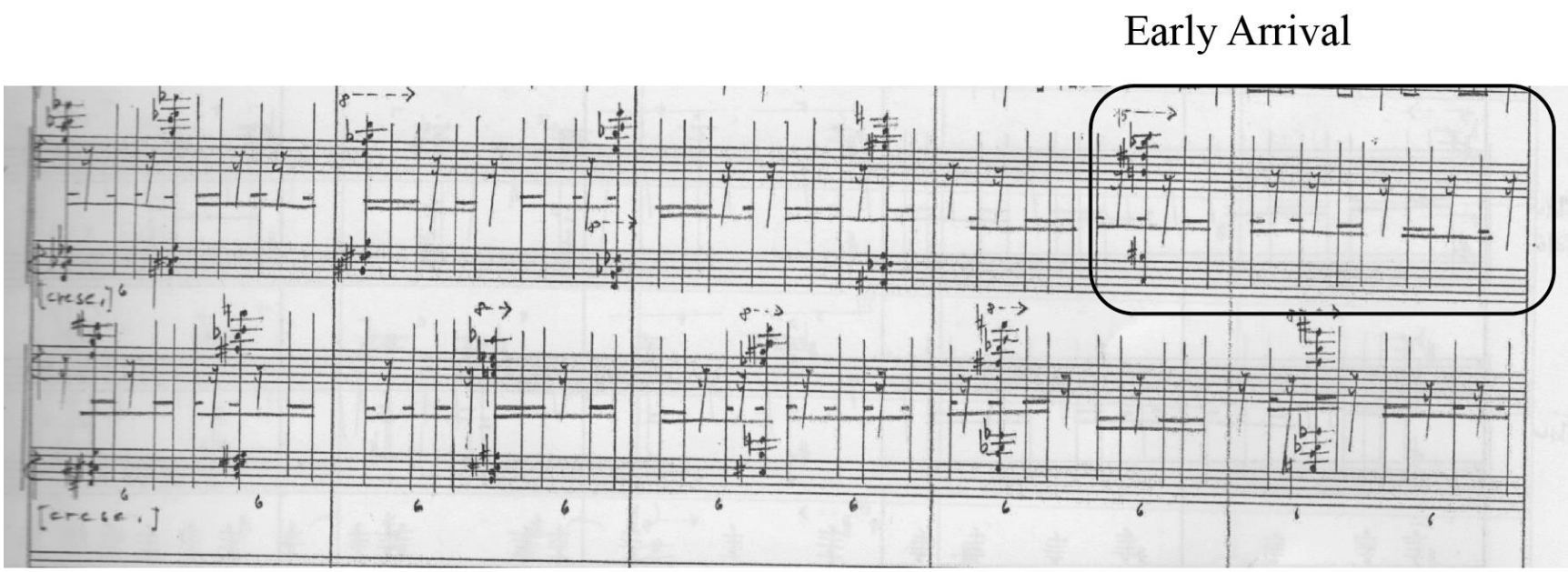


Figure 7.17: Early arrival in *segment 3g* of Beat Furrer's *Konzert für Klavier und Orchester*

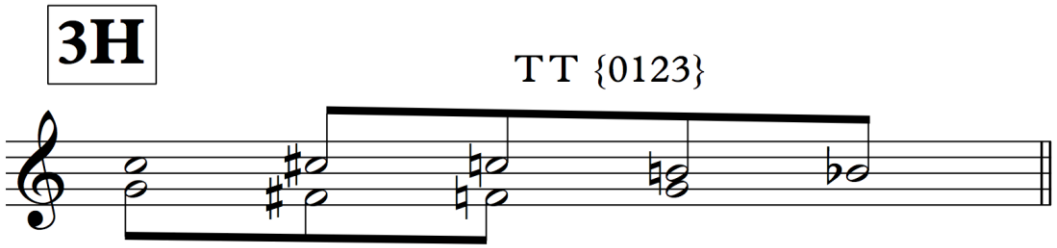


Figure 7.18: Reduction of s*egment 3h*, the compositional climax of Beat Furrer's *Konzert für Klavier und Orchester*

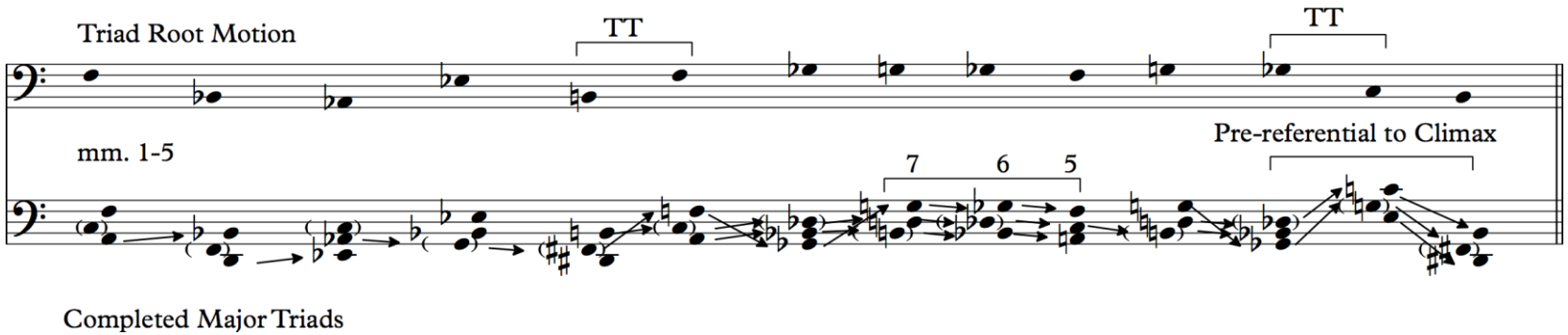


Figure 7.19: *CE 2a* in mm. 1-5, pre-referential to the compositional climax of Beat Furrer's *Konzert für Klavier und Orchester*

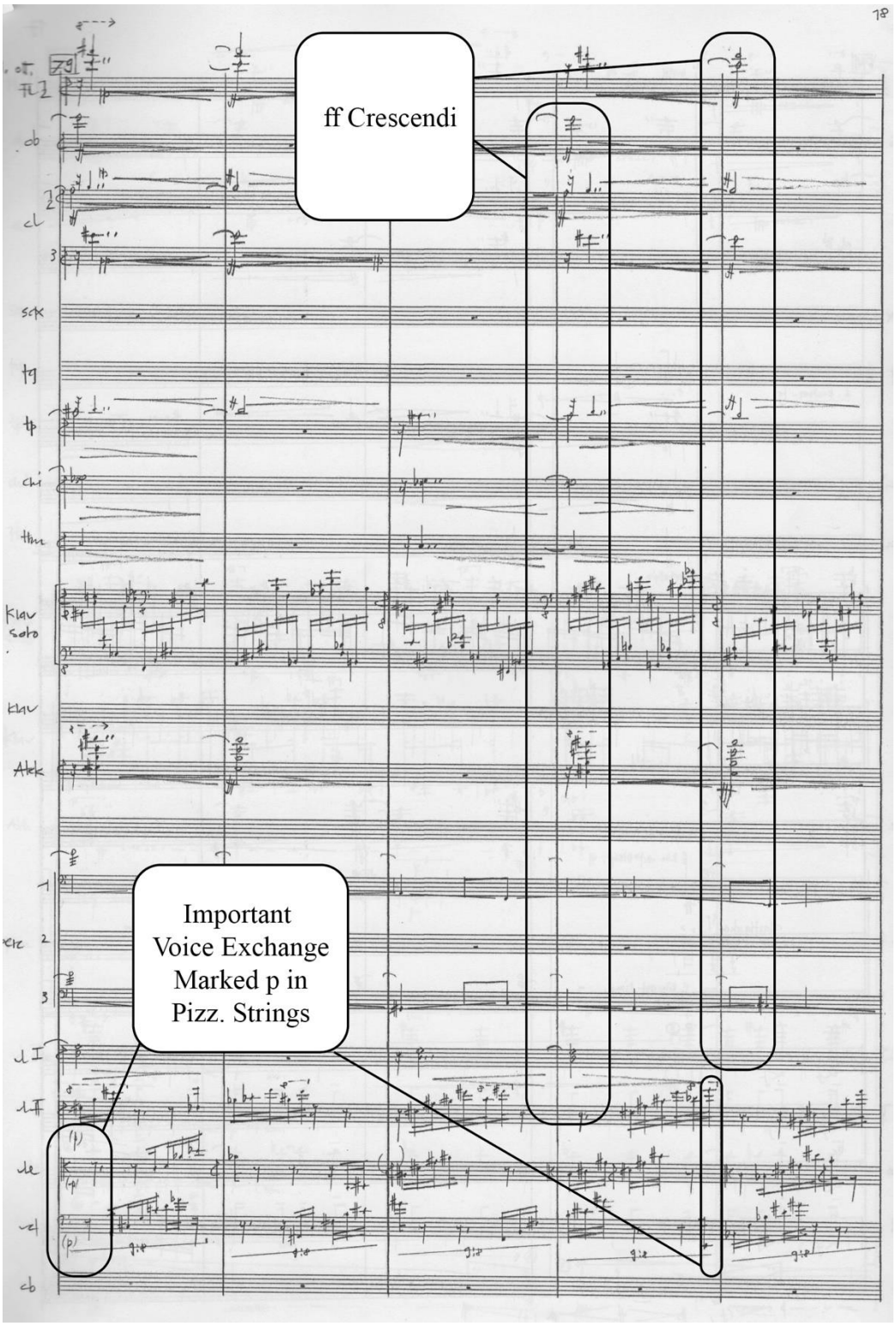


Figure 7.20: *CE 5b* and surrounding texture from Beat Furrer's *Konzert für Klavier und Orchester*

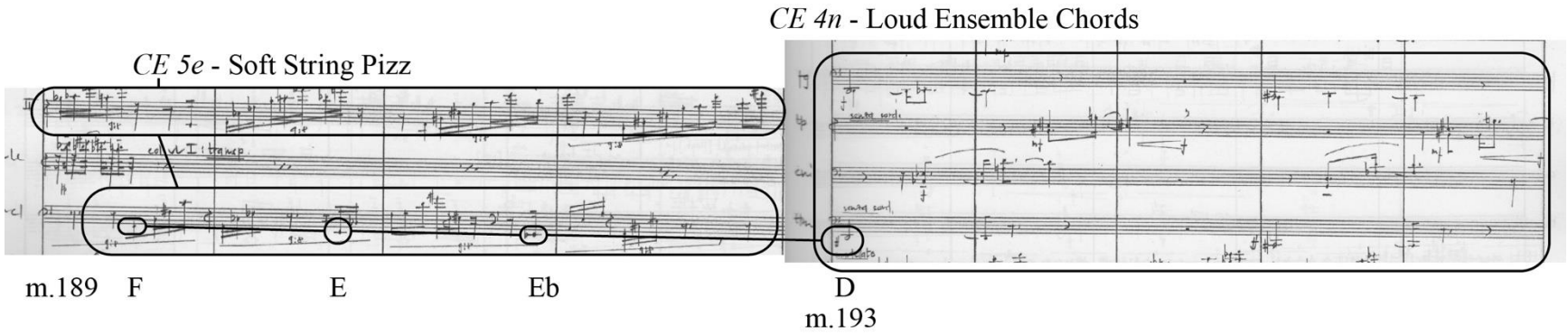


Figure 7.21: *CE 5e* transferring to *CE 4n* in Beat Furrer's *Konzert für Klavier und Orchester*

CHAPTER 8

CONCLUSION

The *work-idea* that I have proposed for Beat Furrer's *Konzert für Klavier und Ochester* is self-identity through infinite iteration. As this concerto unfolds, it achieves a musical identity through a finite number of unique presentations which are results of three different types of infinite loops: pitch class looping, "call and response" looping, and *chromatic event* transformation looping. Therefore, the composition itself can be considered a *strange loop* that achieves identity through the results of these three loops.

Traditional examples of musical *strange loops* often include Johann Sebastian Bach's "Canon per Tonos" from the *Musical Offering* or experimental modern works like James Tenney's *For Ann (Rising)*. Hofstadter describes the "Canon per Tonos" as an "endlessly rising canon," and after "six such modulations, the original key of C minor has been restored!" The canon transposes itself by a major second over and over again, depending on the realization, resulting in a major second pitch class loop. According to Alvin Lucier, *For Ann (Rising)* "consists of overlapping sine tones that start below human audibility and sweep up out of our range of hearing. There are twelve ascending waves; each on starts a minor sixth interval below the preceding one."[57] Tenney has

[57] Alvin Lucier, *Music 109 Notes on Experimental Music* (Middletown, Connecticut:Wesleyan University Press, 2012), 96.

simply framed graduated parallel chromatic ascents whose perception is limited by the range of human hearing, similar to how the range of the piano truncates the mensuration canon in *Section 2 Call* of Furrer's concerto.

At the end of the second quotation in the introduction of this paper, Hofstadter concludes that a *strange loop* is a "paradoxical level-crossing feedback loop."[58] Both *For Ann (Rising)* and the "Canon per Tonos" do in fact fulfill this definition of a *strange loop*.[59] Level crossing occurs in the transposition of material in each composition and paradox is explored in the musical material since both compositions are recursive feedback loops; they end up where they began. While this does in fact fulfill Hofstadter's definition, in my view, the Tenney and Bach are only a first level of musical *strange loops*, since these compositions achieve their identity exclusively by directly engaging with *concepts* that define them as *strange loops*.

Furrer's concerto, however, takes the opposite approach; it is a *strange loop* by virtue of the thorough exploration of its *work-idea*, not as a result of its *concept*. In my view, the *work-idea* of his concerto is identity through looping, and my analysis, in many ways, demonstrates that his concerto achieves identity using transforming iterative loops. Thus, *work-idea* separates itself from *concept*.[60] The Bach and Tenney are based off the *concept* of infinite looping and do achieve identity because of their relationship with this *concept*, but other forces determine the material and form of these compositions.

For instance, the form of *For Ann (Rising)* is not necessarily determined by the

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[58] Hofstadter, *Strange Loop,* 102.
[59] Douglas R. Hofstadter, *Gödel, Escher, Bach: An Eternal Golden Braid* (New York: Basic Books, 1999), 10. Hofstadter uses this canon throughout *Gödel, Escher, Bach* as an example of a *strange loop*.
[60] I am not asserting in any way that *work-idea* is superior to *concept*. In the case of this particular concerto, *work-idea* is a more fulfilling explanation of this work.

concept of the piece; it was simply decided upon by James Tenney. Similarly, with the Bach, the surface material is a product of the limits of the tonal system at the time and of Bach's *concept*, which according to Hofstadter was etched in the margin of the score: "As the modulation rises, so may the King's Glory."[61] Musical material and form in the Bach and the Tenney are simply the result of the *concept* of looping. It is difficult, in fact impossible, to assert that infinite looping is "before, behind, and within every piece" of either the Bach or the Tenney; it is only in the *concept*.

However, since both the Bach and Tenney do qualify as *strange loops*, one must ask the question – is Beat Furrer's piano concerto indeed a *strange loop*? While Furrer's concerto may not be as literal a *strange loop* as the other two pieces, Hofstadter's definition of *strange loops* does allow for a more abstract, transformational concept of looping:

> Our second image, in contrast, is the famous label of a Morton Salt box, which shows a girl holding a box of Morton Salt. You may think you smell infinite regress once again, but if so, you are fooling yourself! The girl's arm is covering up the critical spot where the regress would occur. If you were to ask the girl to (please) hand you her salt box so that you could actually see the infinite regress, you would wind up disappointed, for the label on *that* box would show her holding a yet smaller box with her arm once again blocking the regress.
>
> And yet we still have a self-referential picture, because customers in the grocery store understand that the little box shown on the label is the same as the big box they are holding. How do they arrive at this conclusion? By using analogy. To be specific, not only do they have the large box in their own hands, but they can see the little box the girl is holding, and the two boxes have a lot in common (their cylindrical shape, their dark-blue color their white caps at both ends); and in case that's not enough, they can also see salt spilling out of the little one. These pieces of evidence

[61] Ibid.

> suffice to convince everyone that the little box and the large box are identical, and there you have it: self-reference without infinite regress.[62]

Furrer's concerto fits this broader description of a *strange loop*, since looping is occurring in at least three compositional strata which ultimately accounts for all the musical material contained in the composition. These three layers are: 1) utilization of the chromatic scale throughout the composition, 2) looping of "call and response," and 3) the transformational looping of related *chromatic events*.[63]

Pitch Class Looping

A hypothetical spectrum can be constructed of compositions that employ the chromatic scale, placing *For Ann (Rising)* on one side, representing an uncompromisingly direct exploration of rising pitch class looping, and "L'amour est un oiseau rebelle," the Habanera, from *Carmen* on the other. It would be difficult to place Furrer's concerto on this spectrum. His use of the chromatic scale is so extensive in this concerto that the composition shares characteristics with both poles. *CE 1q* is comfortable next to the Habenera while *CE 1s* shares many characteristics of the Tenney. The spectrum-busting characteristics of this concerto further demonstrates that Furrer is in fact composing *with* the properties of the chromatic scale rather than just *using* the chromatic scale.

A relationship with paradox is a requisite for *strange loop* categorization and chromatic ascent in this concerto is able to engage directly with three important

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[62] Hofstadter, *Strange Loop,* 144.

[63] While Furrer's composition is not the first piece of music to have a strong relationship with the chromatic scale, it is certainly one of the most comprehensive.

paradoxes:

The Dichotomy Paradox:

> *Zeno:* Oh, shame on me. Of course you're right. That's the one about how, in getting from A to B one has to go halfway first – and of that stretch one also has to go halfway, and so on and so forth.[64]

Achilles and the Tortoise:

> *Zeno:* But in that very short flash, the Tortoise has managed to inch ahead by ever so little, and so Achilles is still behind. Now you see that in order for Achilles to catch the Tortoise, this game of "try-to-catch-me" will have to be played an INFINITE number of times – and therefore Achilles can NEVER catch up with the Tortoise!
> *Tortoise:* Heh heh heh heh![65]

Buridan's Ass:

> …the example that has come down to us known as 'Buridan's Ass', in which a donkey starves to death because it has no reason to choose between two equidistant and equally tempting piles of hay.[66]

The Dichotomy Paradox is being explored in the composition when oblique divergent motion or convergent motion is in play and *Achilles Versus the Tortoise* occurs when parallel divergent or convergent motion is present. This composition does not seek to answer either of these paradoxes; it strives to project salient musical material related to the essence of each of these paradoxes, when represented through music. For instance, *Achilles Versus the Tortoise* is essentially about the relationship of two entities moving at two different rates of speed, analogous to the mensuration canon of *Section 2 Response*.

Buridan's Ass is related to ambiguity, a major topic in the pitch content of

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[64] Ibid., 32.
[65] Ibid.
[66] Zupko, Jack, "John Buridan", *The Stanford Encyclopedia of Philosophy* (Spring 2014 Edition), December 1, 2015, http://plato.stanford.edu/archives/spr2014/entries/buridan/.

Furrer's concerto. In this composition, the variation of *Buridan's Ass* in which the donkey has to choose between hay and water is more appropriate than the standard version of two equal options (two bowls of food or two bowls of water) because chromatic ascent or descent embodies a high level of acoustical ambiguity involving two equivalent yet different choices: up or down a minor second.

Therefore, extensive use of minor second ascent and descent establishes this concerto as an exhaustive study in pitch or pitch class ambiguity. The thousands of pages devoted to exploring the most famous example of chromatic polysemy, the *Tristan* chord, attest to the power of vagueness in highly chromatic environments. One specific example of ambiguity is the structural nesting of half step oscillation in *Section 1 Call*, also known as the war between pitch class B and pitch class C. Also, differing analyses of *Section 2 Response* result in two valid, yet unique results which is another particularly salient demonstration of ambiguity.

"Call and Response" Looping

The second important identity building loop of this concerto is that of "call and response." This idea was explored at the end of Chapter 2, but it is even more demonstrable now that the preceding analysis established that many of the musical gestures, *segments*, and formal units of this composition consist of literal or abstract "call and response" cycles. For example, *Section 1 Call* was previously determined to utilize a "call and response" that transforms over time, eventually reversing and becoming "response as call."

While *Section 1 Call* is an important example, there are many other instances in

this concerto that are relevant to "call and response" looping. The structure of the mensuration canon in *Section 2 Response* can be viewed as part of the "call and response" looping as the second chromatic ascent is a "response" to the first. *CEG 10* events all involve alternation of two sonorities and can be considered "call and response" loops. The compositional climax of the concerto is a clear example of "call and response" between the sustained ensemble chords and hammered chords of the solo piano. Finally, as demonstrated before, the fundamental principle of "call and response," cause and effect, can be imbedded inside of a single gesture, demonstrated in *CE 3d*. The first low note struck is the "call," while the higher secondary chromatic ascent consists of the "response." Therefore, "call and response" loops are nested; they exist from the gesture all the way up to *section*-level formal units.

Chromatic Event Looping

The above excerpt from *I Am a Strange Loop* helps to explain how transformation of c*hromatic event* sub-groups contributes to establishing the self-identity of the concerto. As stated many times in this analysis, the first instance of a *chromatic event* sub-group is the most varied version. Events within the sub-groups transform as the composition progresses, albeit on a severely narrow scale; however, they are able to leap from level to level in terms of function as they change. The transformation of these *chromatic event* sub-groups creates a tautological lifespan in terms of both material and use for each *chromatic event* sub-group, avoiding a strict repetition and restricted function. The sub-groups tell their own story as well as contributing to the larger narrative of the concerto. This important c*hromatic event* metamorphosis loop is best demonstrated with *CEG 3*

events and the *CE 5a* sub-group.

CE 3a, the initial instance of *CEG 3,* is extremely similar in terms of musical surface to other *CEG 3* events, but nearly unrecognizable in terms of ordered pitch class, shown in Figure 8.1. The final three pitches are seized from the middle of an unrelated transposition of PCo 10a and P10a itself is a truncated form of the "master" pitch collection for this event: PCo 10. *CE 3a* simply introduces the basic surface material of *CEG 3,* asserting that the role of these events is to move obliquely against the *CE 4a* sub-group pedals, creating the impetus to move from one *segment* to another. *CE 3b* then occurs, using PCo 10a without variation, signaling a move towards rigid pitch collection conformity, shown in Figure 8.2. These similar *chromatic events* continue transforming as the *Response segments* of *Section 1 Call* – they expand in length and insistency which results in the eventual presentation of simple transposition of unvaried PCo 10 in *CE 3f*, shown in Figure 8.3. At this point, *CEG* 3 has attained a level of self-awareness about its role in the composition, using its clearest, least varied presentation to aggressively challenge the *CE 4g* pedal in *segment 1n.* After *CE 3f*, the gesture does not return. *Chromatic event* transformation loops often follow this cycle: introduction, use, refinement.

The same kind of transformational narrative occurs in *CEG 5a* sub-group events. The first instance, *CE 5a* enters tentatively and only hints at voice exchange, followed by *CE 5c* confidently using voice exchange to establish the critical pitch-class E as a pedal in *Section 1 Call*, shown in Figure 8.4. After this tremendous achievement, *CE 5e* initiates the first real descent in *Section 2 Call*. By the final iteration, *CE 5h* loses its structural function and simply projects moving stasis through chromatic voice exchange

as a very secondary gesture. Since the identity of the *CE 5a* sub-group is defined by voice exchange, it seems quite natural the variations of these events are tied to how voice exchange functions in this concerto. The *CE 5a* sub-group events are introduced, used, then refined until projecting their purest idea: stasis as a result of voice exchange. These two examples, *CEG 3* and the *CE 5a* sub-group, demonstrate that the transformation of *chromatic event* sub-groups represents active "processes of categorizing, mental replaying, reflecting, comparing, counterfactualizing, and judging."

Conclusion

More so than many artistic compositions that fit this claim, Beat Furrer's *Konzert für Klavier und Orchester* is truly greater than the sum of its parts. On one hand, its gestalt success is a commendable achievement *in spite* of the elemental nature of the musical material that comprises the concerto and the basic compositional techniques used to generate and vary the material. On the other hand, the success of this composition is a *result* of the elementary nature of its components and the simple processes used to vary this material. More specifically, the concerto's effective perceptibility is the result of Furrer's thorough understanding of a clandestine musical potential of a basic element of music: recursion. Recursion builds the identity of this concerto by transforming material in such a way that it often contributes to a musical goal, resulting in a teleological transformational minimalism. The surface material of this concerto conveys an overwhelming amount of acoustical and musical information carefully regulated by elementary yet intricate processes. Without balancing these two attributes, surface acoustic complexity and elementary construction, this concerto would be delineated

simply by high contrast or suffer from lack of interesting, dynamic material. Through rigorous work and relatively narrow musical transformations, largely occurring through pitch class looping, "call and response" looping, and *chromatic event* transformation looping, Furrer is able to attain equilibrium which results in a rich musical work that includes the potential for profound extra-musical depth.

Ton De Leeuw writes about the need for such work:

> The most important developments observed in the latest period are of an extra-musical nature: the enormous geographical distribution of creative activity, the growing awareness of the fact that we live in a multicultural world with the associated signs of acculturation, and, finally, the strongly increased international economic and commercial pressure on musical life. All this gives rise to opposing forces which are difficult to control.
>
> The modern composer can do little about all this. But it is precisely his marginal role as a creative artist in contemporary society that should enable him to consider matters from a distance and become aware of that which is essential. This could induce the perception that genuine innovation in music can no longer be based primarily on aesthetic and/or technical principles, but must be of a spiritual nature, in the broad sense of the word, as only the possible counterpart to our materialistically orientated society.[67]

De Leeuw may be inferring that composers should sit down and create works intently of a broad spiritual nature, but there is another way to interpret his observation: critical mass. The "aesthetic and/or technical principles" have become so assiduously explored that innovation is no longer possible in these domains. Innovative work will, regardless of intent, project an extra-musical element.

Furrer's concerto most likely falls into this category. Its thorough use of looping

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[67] Ton De Leeuw, *Music of the Twentieth Century*, trans. Stephen Taylor (Amsterdam: Amsterdam University Press, 2005), 204.

represents a development, an evolution, and a more thorough exploration of extra-musical philosophical ideas tethered to conceptual compositions like *For Ann (Rising)* or "Canon per Tonos." While the mathematical basis of recursive looping may seem in opposition to even the broadest sense of "spiritual nature," Hofsteadter's claims about the nature of identity in *I am a Strange Loop* provide ample evidence that Beat Furrer's *Konzert für Klavier und Orchester* engages with spiritual nature when broadly defined.

That is to say, as listeners, we allow the concerto to self-identify through the results of its iterative loops *as we listen to it*. This concerto only achieves identity because of our ability to perceive the identity-building potential of its loops. We are in fact able to comprehend these loops, as they occur in real-time, for three main reasons: 1) Furrer *wants* us to recognize them because of the overt presentation of the chromatic scale as primary material, 2) many of these loops result in clear, goal-oriented transformations, and 3) the musical material that is varied retains much of its surface characteristics, even after it has been transformed, shown by the slight differences between the solo piano parts from Figure 8.1 – 8.2.

Therefore, musical transformation, or development, is a direct result of the interaction of different, active iterative loops and in my view, identity through infinite iteration is a credible *work-idea* for this concerto, placing it squarely in the category of a *strange loop*, as defined by Douglas Hofstadter. Since Hofstadter's work engages directly with how identity is achieved, a cornerstone of spiritual exploration, Furrer's concerto lends credence to De Leeuw's observations on the current state of music composition.

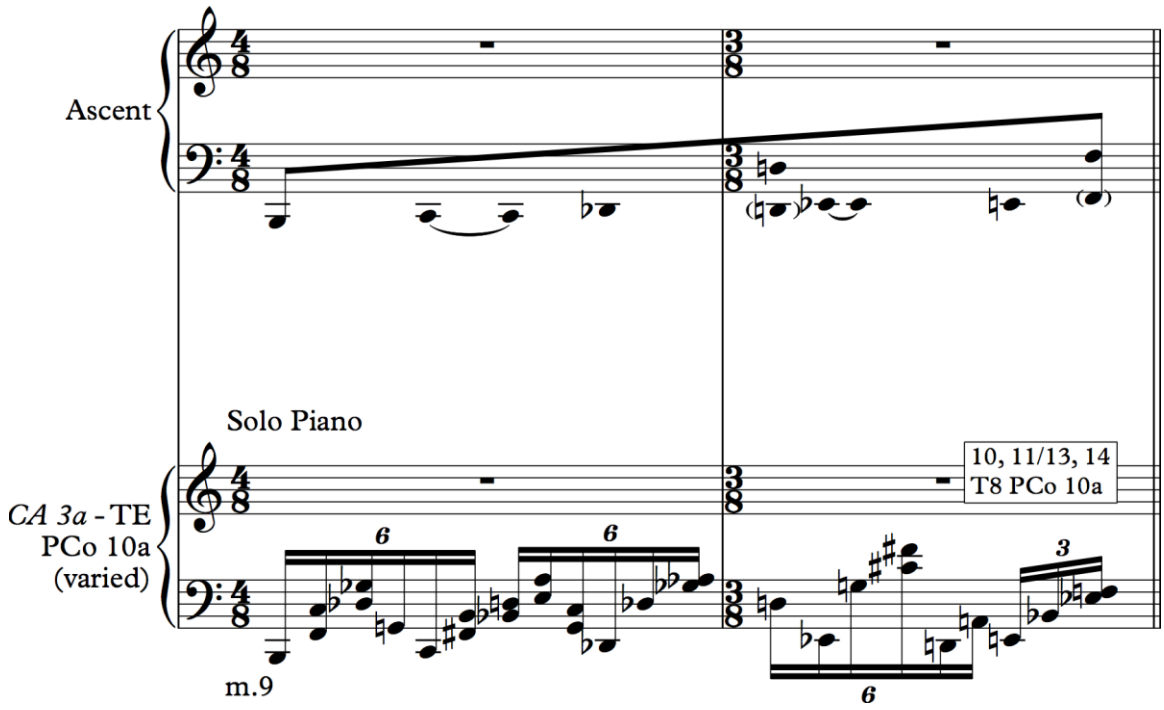


Figure 8.1: *CE 3a* in Beat Furrer's *Konzert für Klavier und Orchester*

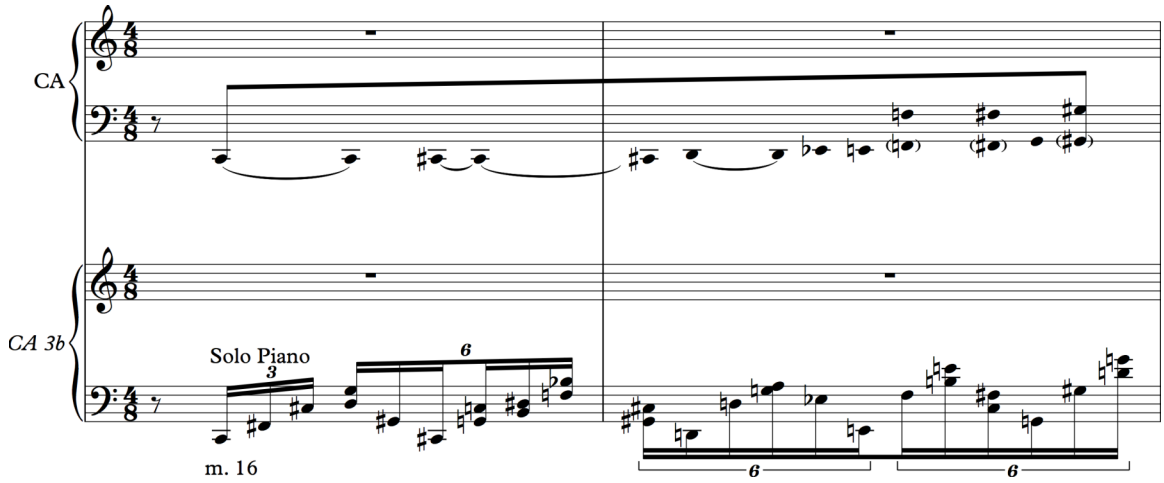


Figure 8.2: *CE 3b* in Beat Furrer's *Konzert für Klavier und Orchester*

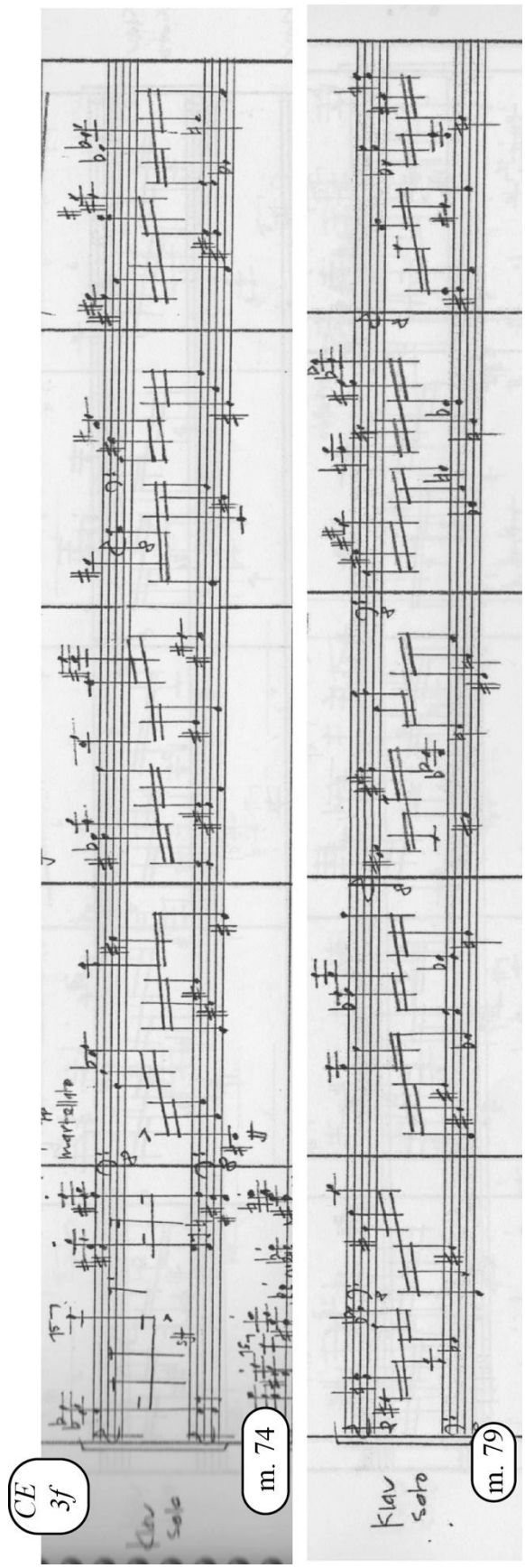


Figure 8.3: *CE 3f* in Beat Furrer's *Konzert für Klavier und Orchester*

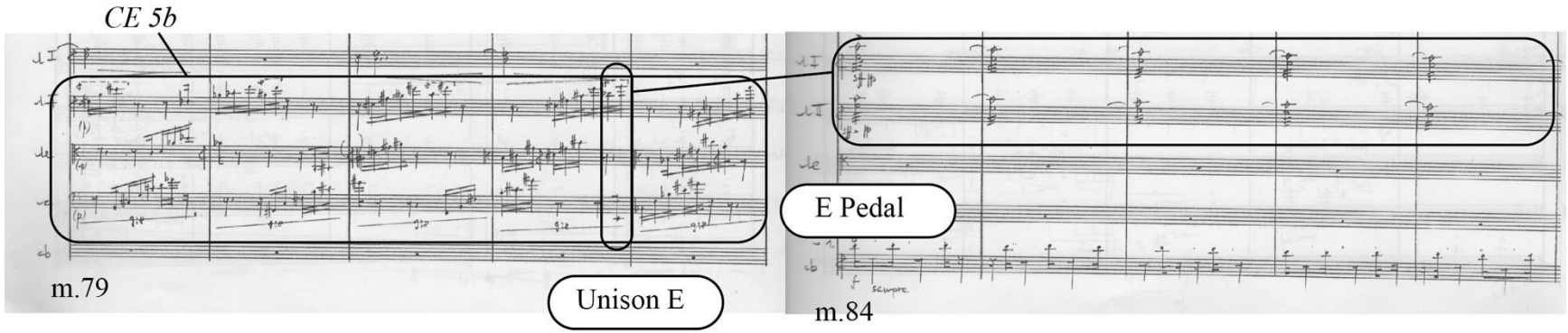


Figure 8.4: *CE 5b* establishing pitch class E before an important E pedal in Beat Furrer's *Konzert für Klavier und Orchester*

APPENDIX A

CHROMATIC EVENT GROUPS

Table A.1: *Chromatic Event Groups* in Beat Furrer's *Konzert für Klavier and Orchester*

CEG#	Abbreviation	Name	First Entrance	Last Entrance
1	CEG1 - PnoChrom	Piano Chromatic Sets	Seg 1a	Seg 3j
2	CEG2 - ChromConn	Chromatic Connections	Seg 1a	Seg 2q
3	CEG3 - TripletPnoArp	Triplet Piano Arpeggios	Seg 1c	Seg 1n
4	CEG4 - 15Sust	15-Count Sustain	Seg 1c	Seg 3i
5	CEG5 - EnsChrom	Ensemble Chromatic Sets	Seg 1l	Seg 3e
6	CEG6 -32Ost	Stepwise 32nd-note Ostinati	Seg 1l	Seg 3f
7	CEG7 - PnoPed	Piano Pedals	Seg 1d	Seg 3j
8	CEG8 - ArtPed	Articulated Pedals	Seg 1a	Seg 3f
9	CEG9 - SusPed	Sustained Pedals	Seg 1o	Seg 3j
10	CEG10 - MovPed	Moving Articulated Pedals	Seg 1g	Seg 3e

Table A.2: *Chromatic Event Group 1* in Beat Furrer's *Konzert für Klavier and Orchester*

Chromatic Event Group 1: Piano Chromatic Sets			
ID	**Location**	**Instrument**	**Notes**
a	1a	Ensemble Piano	T, E, 0, 1, 2 Rising Chromatic Ascent
b	1a	Solo Piano	[TE0], [E01], [01], [012], [12]
c	1b	Ensemble Piano	9, T, E, 0, 1 Rising Chromatic Ascent
d	1b	Solo Piano	[9T], [E0], [12]
e	1d	Ensemble Piano	T, E, 0, 1, 2 Rising Chromatic Ascent
f	1d	Solo Piano	[TE], [E0], [01], [12]
g	1f	Ensemble Piano	T, E, 0, 1, 2 Rising Chromatic Ascent
h	1f	Solo Piano	[TE], [E1], [12]
i	1h	Ensemble Piano	{9E012356} Free, loose wedge with moment on 3
j	1h	Solo Piano	[TE], [12]
k	1j	Ensemble Piano	[E0], 0, [01], 1, [02], 2, [23], 3, [34], 4
l	1j	Solo Piano	[E0], [01], [12], [23], [34]
m	1l	Ensemble Piano	E, [E0], 0 2-bars each
n	1o	Solo Piano	[01, [23]
o	1p	Solo Piano	[23], [34]
p	1q	Solo Piano	Triads
q	2f	Solo Piano	7, 8, 9, T, E, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, T, E
r	2i	Solo Piano	0, 1, 2, 3, 4, 5, 6, 7, 8, 9
s	2r	Solo Piano	Mensuration Canon
t	3j	Ensemble Piano	Ending Descent - 9, 8, 7, (6), 5, 4, (3), 2, 1, 0, E, T, 9, 8, 7, 6, (5), 4, 3, 2, 1, 0, E, T, 9, 8, 7, 6, 5, 4, 3, 2, 1, 0, E

Table A.3: *Chromatic Event Group 2* in Beat Furrer's *Konzert für Klavier and Orchester*

Chromatic Event Group 2: Chromatic Connections			
ID	**Location**	**Instrument**	**Notes**
a	1a	Solo Piano	Slide/Plane Piano Dyads (implying major triads)
b	1b	Solo Piano	Slide/Plane dyads or triads (major or implying major)
c	1d	Solo Piano	Slide/Plane dyads or triads (all major or minor except on M2 dyad)
d	1f	Solo Piano	Slide/Plane dyads, triads [major/minor], or trichords [025] [027]
e	1h	Solo Piano	Slide/Plane dyads, triads [major/minor], or trichords [025] [027]
f	1j	Solo Piano	Slide/Plane dyads, triads [major/minor], trichords [025] [027], or hexachords mostly with a [017] sound in the bass and a major or minor triad on top
g	1l	Solo Piano	Slide/Plane dyads, triads, trichords, tetrachords, hexachords, heptachords, or octachords with occasional P5 clusters
h	1m	Solo Piano, Ensemble Piano	Slide/Plane Varied Chromatic Material
i	1o	Solo Piano, Ensemble Piano	Slide/Plane Varied Chromatic Material
j	1p	Solo Piano, Ensemble Piano	Slide/Plane Varied Chromatic Material
k	1q	Solo Piano, Ensemble Piano	Slide/Plane Varied Chromatic Material
l	2q	Solo Piano + Ensemble Piano	Slide/Plane Varied Chromatic Material

Table A.4: *Chromatic Event Group 3* in Beat Furrer's *Konzert für Klavier and Orchester*

Chromatic Event Group 3: Triplet Piano Arpeggios			
ID	**Location**	**Instrument**	**Notes**
a	1c	Solo Piano	TE - PCo 10a
b	1e	Solo Piano	T0 - PCo 10a
c	1g	Solo Piano	T9, TT, TE, T0, T1 - PCo 10 w/rests
d	1i	Solo Piano	T0 - PCo 10
e	1k	Solo Piano	T0, T1, T2, T3, T4 - PCo 10 w/shifts
f	ln	Solo Piano	T3, T4, T5, T6 - PCo 10 hemiola 4:9

Table A.5: *Chromatic Event Group 4* in Beat Furrer's *Konzert für Klavier and Orchester*

Chromatic Event Group 4: 15-Count Sustain			
ID	**Location**	**Instrument**	**Notes**
a	1c	Winds, Brass, Acc., Crotales, Strings	Chord 1 [234589TE] Chord 2 [0167]
b	1e	Winds, Brass, Acc., Crotales, Strings	Chord 1[345689TE0] Chord 2 [1278]
c	1g	Winds, Brass, Acc., Crotales, Strings	Chord 1 [23489T] Chord 2 [E014567]
d	1i	Winds, Brass, Acc., Crotales, Strings	Chord 1 [014567TE] Chord 2 [2389]
e	1k	Winds, Brass, Acc., Crotales, Strings	Chord 1 [012346789T] Chord 2 [67E0]
f	1m	Fl., Ob., Cl.	[TE0]
g	1n	Winds, Brass, Acc., Crotales, Strings	Chord 1 [2345789TE] Chord 2 [E0167]
h	1q	Ens. (no Perc.)	Descent 1 - T, 9.5, 8, 7, 6, 5, 4, 3, 1.7, 1.5, E, 9.5, 8.5, 6, 4
i	1r	Cl. 1 + 2, Hrn. 1, Vla., Vc.	Overtone Chord on C [2 4 5.5 6]
j	2a/2b, m. 122	Fl. 1, Ob., Tpt. 1 + 2, Acc.	[23489] Sustained, staggered pedal
k	2d, m. 142	Ob., Sax.	[34] Sustained Pedal
l	2e	Vln. 1, Acc.	[678]
m	2k	Fl.. 1, Ob.1, Tpt. 1, Acc.	Chromatic Connections (CEG6)
n	2l	Ens. (no Perc.)	2, 3, 2, 1, 0 - 1, 2, 1, 2
o	2m	Ob. 1, Tpt. 1, Hrns. 1+2, Dbl. Bs.	Chromatic Connections (CEG6)
p	2p	Ens. (no Perc.)	0, 1, 2, 1, 2 - E, 0, 1, 2, 3
q	3a	Ens. (no Perc.)	1, 0, 1, [E0]
r	3e	Ens. (no Perc.)	2, 1, 0 - 0, 1, 2 Voice Exchange
s	3h	Ens. (no Perc.)	0, 1, 0, E
t	3i	Ens. (no Perc.)	Descent 2 - T, 8, 6, 4, 3, 1, 0, T, 9, 7, 5, 3,2, 1, E, T, 9, 6, 5, 3, 2, 1, E

Table A.6: *Chromatic Event Group 5* in Beat Furrer's *Konzert für Klavier and Orchester*

Chromatic Event Group 5: Ensemble Chromatic Sets			
ID	**Location**	**Instrument**	**Notes**
a	1l	Vln. 1 + 2, Vla., Vc.	[E5], [06], [17], [28], [39] Upper Voice Ascent w/[T4], [93], [82], [71], [60] Lower Voice Descent
b	1n	Rin on Timpani (Perc. 1 + 3)	Two-voice ascending M3 descending m3 glissandi starting on [4] and descending M3 ascending m3 starting on [1] resulting in voice exchange
c	1n, m. 78	Vln. 2, Vla., Vc.	[17], [28], [39] , [4T] , [5E] Upper Voice Ascent w/[93], [71], [60], [5E], [4T] Lower Voice Descent
d	1r	Chinese Cymbal on Timpani (Perc. 1 + 3)	1, 0, E, T Descending Glissandi
e	2k	Vln. 2, Vc.	[T4], [E5], [06], [17], [28], [39], [4T], [50], [61]Upper Voice Ascent w/ [E4], [T3], [93], [82], [71], [60], [5E], [4T], [39] Lower Voice Descent
f	2k	m. 182 Rin on Timpano (Perc. 3)	4, 5, 6, 7, 8, 9 (M3 Ascending Glissandi, then m3 Descending Glissandi)
g	2q	Perc. 1 + 3	1, 2, 3, 4, 5, 6, 7, 8, 9, T, E, 0
h	3e	Vln. 1, Vc.	[82], [93], [T4], [E5], [06], [17], [28] Upper Voice Ascent [71], [60], [5E] , [4T] , [39], [20], [17] Lower Voice Ascent
i	3e	Rin on Timpano (Perc. 3)	4, 5, 6, 7, 8, 9 M3 (Glissando Ascent then m3 Glissando Descent)

Table A.7: *Chromatic Event Group 6* in Beat Furrer's *Konzert für Klavier and Orchester*

Chromatic Event Group 6: Transposed 32nd-note Ostinati				
ID	**Location**	**Instrument**	**PCo**	**Notes**
a	1l	Winds (no Oboe)	PCo 2	Two expanding to five voice 16-note transposed ostinato
b	2b	Vl. 2, Vla., Vc.	PCo 1	Three voice 15-note ostinato lower voices converge intervallicaly upward toward top voice
c	2d	Bs. Cl.	PCo 12/PCo 12a	11-note single voice ostinato T1 PCo 12/T0 PCo 12a
d	2e	Cl. 1 + 2	PCo 3/PCo 3a	Two voice 10-note ostinato P4 T0-TE
e	2f	Vln. 2, Vla., Vc., + Vln. 1 m.157	PCo 4	Highly Varied three voice 13-note ostinato with lower voice upward convergence and no clear pattern beat 4 m.157-159
f	2g	Solo Piano	PCo 1	15-note ostinato T0, T1, T2, T3, T4
g	2j	Solo Piano	PCo 1	15-notes ostinato T2, T3, T4, T5, T6, T7
h	2k	Solo Piano R. H.	PCo 1	15-note ostinato T0-TE elongated with rests
i	2k	Solo Piano L. H.	PCo 5	13-note ostinato T0-TE elongated with rests converges into CE 6h
j	2k	Winds	PCo 6	9-note ostinato in structrually in sync with CE 6k until 187
k	2k	2, Vc. + Vln. 1 m.	PCo 6	9-note ostinato that changes in m. 187 lower voice interval convergence to upper voice
l	2l	Solo Piano	PCo 1	Two-voice15-note ostinato P4 T0-T6
m	2m	Winds	PCo 6-PCo 7	Three expanding to four-voice two pattern 9-note ostinato varied transp. Changes to PCo7 in bar 203.
n	2m, m. 207	Perc. 1 + 3	PCo 1	Two voice 15-note ostinato at T [94], T [TE], T[E6]
o	2n, m. 217	Perc. 1 + 3	PCo 1	Two voice 15-note ostinato at P4 T[83], T [94],T [T5]
p	2n	Winds, Tpt. 1 + 2	PCo 11	Five voice 11-note ostinato [T0, T1,T5, T6, TE]
q	2p	Solo Piano	PCo 1	Two-voice 15-note ostinato P4 T0-T7
r	2q	Fl., Cl. 1 + 2	PCo 8	Three-voice 17-note ostinato pedal [T0, T2, T7]
s	3c	Vln. 1, Vln. 2, Vc.	Various	Patterns similar to other CEG6 Events
t	3e	Solo Piano R. H.	PCo 1	15-note ostinato T0-TE
u	3e	Solo Piano L. H.	PCo 5	13-note ostinato T0-TE converges into CE 6t
v	3f	Winds	PCo 1	Three expanding to four-voice two pattern 15-note ostinato
w	3f	Vln. 1, Vc.	PCo 9	11-note ostinato moving up in M2 with convergence
x	3f, m. 338	Perc. 1 + 3	PCo 1	Two voice 15-note ostinato at T [94], T [TE], T[E6]

Table A.8: *Chromatic Event Group 7* in Beat Furrer's *Konzert für Klavier and Orchester*

Chromatic Event Group 7: Piano Pedals			
ID	**Location**	**Instrument**	**Notes**
a	1d	Esnemble Piano	0 - Articulated Pedal High Octave
b	1m	Solo Piano, Ensemble Piano	0 - Articulated Pedal High Octave
c	1o	Solo Piano, Ensemble Piano	[E0] Articulated Pedal High Octave
d	1p	Ensemble Piano	[E0] Articulated Pedal High Octave
e	1q	Ensemble Piano	[E0] Articulated Pedal High Octave
f	2a	Solo Piano	{12} Arpeggiated dyad with a 27-note ostinato
g	2b	Solo Piano	{34} Arpeggiated dyad with a 24-note ostinato
h	2c	Solo Piano, Ensemble Piano	[234] Octaves Articulated Pedal
i	2d	Solo Piano	{34} Arpeggiated dyad with a 27-note ostinato
j	2e	Solo Piano, Ensemble Piano	{56} Arpeggiated dyad with a 15-note solo piano ostinato and a 12-note ensemble piano ostinato
k	2f	Solo Piano, Ensemble Piano	{567} Arpeggiated trichord with a 20-note solo piano ostinato and a 15-note ensemble ostinato
l	2h	Solo Piano, Ensemble Piano	[67] Octaves Articulated Pedal
m	2i	Solo Piano, Ensemble Piano	{56} Arpeggiated dyad with a 15-note solo piano ostinato and a 20-note ensemble piano ostinato
n	2m, m. 207	Ensemble Piano	2 - Sustained Pedal
o	2o	Solo Piano	[89TE046] Articulated Pedal High Octave
p	2q	Solo Piano	[TE] Articulated Pedal High Octave
q	3a, m. 298	Ensemble Piano	2 - Sustained Pedal
r	3b	Solo Piano, Ensemble Piano	[E0] - Articulated Pedal High + Low Octave
s	3c	Solo Piano	{0123456789TE} Hammered Chords
t	3d	Solo Piano	[01] Octaves Articulated Pedal
u	3g	Solo Piano	[89TE06] Articulated Pedal High Octave
v	3h m. 349	Solo Piano	{0123456789TE} Hammered Chords
w	3i	Solo Piano	{23456789TE} Hammered Chords
x	3j	Solo Piano	{23456789TE} Hammered Chords

Table A.9: *Chromatic Event Group 8* in Beat Furrer's *Konzert für Klavier and Orchester*

Chromatic Event Group 8: Articulated Pedals			
ID	**Location**	**Instrument**	**Notes**
a	1a	Vln. 1 + 2, Vla.	[012]
b	1b	Vln. 1 + 2, Vla.	[012]
c	1d	Vln. 1 + 2, Vla.	[012]
d	1m	Vln. 1 + 2, Vla., Vc.	[89TE]
e	1o	Dbl. Bs.	E
f	1o	Fl. 2, Cl. 1 + 2, Tpt. 1 + 2, Tbn. 1, Acc.	[E012]
g	1q	Vln. 2	4
h	1p	Vln. 1 + 2	4
i	2a	Tbn. 1 + 2	1
j	2a	Vln. 1, Vla., Vc.	1
k	2a	Dbl. Bs.	1
l	2c	Ob., Cl. 3, Acc.	[9TE023456]
m	2c	Fl. 1 + 2, Cl. 1 + 2, Tpt. 1 + 2, Hrn. 1 + 2, Tbn. 1 + 2	[3469T] - [1349T]
n	2d	Tbn. 1 + 2	3
o	2d	Fl. 1 + 2, Cl. 1 + 2, Tpt. 1 + 2, Hrn. 1	[34]
p	2d	Dbl. Bs.	2
q	2e	Vln. 2, Vla., Vc., Dbl. Bs.	[456]
r	2f	Tbn. 1 + 2	6
s	2f	Vln. 1	7
t	2f	Ob., Sax., Bs. Cl., Bsn. 1 + 2, Tpt. 1 + 2	[167]
u	2g	Vln. 1 + 2, Vla., Vc.	[78]
v	2h	Fl. 1 + 2, Ob., Cl. 1 + 2, Bsn. 1, Tpt. 1 + 2, Hrn. 1 + 2, Tbn. 1 + 2	[3569T] + [4] m. 166, + [1] m. 168
w	2h	Vln. 1, Vc.	[26789] Pedal
x	2i	Tbn. 1 + 2	8
y	2i	Fl. 1, Cl. 1 + 2, Bsn. 1 + 2, Tpt. 1 + 2	[789T]
z	2j	Vln. 1 + 2, Vla., Vc.	[123]
aa	2m	Vc., Vln. II	[128] Pedal
ab	2n	Vln. 2	9
ac	2n	Vln. 1, Vla., Vc.	[0123]
ad	2o	Vln. 1 + 2, Vla., Vc.	[78TE]
ae	2o	Dbl. Bs.	E
af	2r	Vln. 1, Vc.	[26]
ag	3f	Dbl. Bs.	E
ah	3f	Tbn. 1 + 2	E
ai	3f	Acc., Vln. 2, Vla.	[6789]

Table A.10: *Chromatic Event Group 9* in Beat Furrer's *Konzert für Klavier and Orchester*

Chromatic Event Group 9: Sustained Pedals			
ID	**Location**	**Instrument**	**Notes**
a	1l	Acc.	[E06]
b	1m	Acc.	[TE056]
c	1o	Vln. 1 + 2	4
d	1p	Vln. 1	4
e	2b	Tbn. 1 + 2	[34]
f	2b	Vln. 1	4
g	2c	Vln. 2, Vla., Vc., Dbl. Bs.	[0456]
h	2e	Tbn. 1 + 2	[56]
i	2g	Acc., Tbn. 1 + 2	[45TE]
j	2i	Acc., + Ob.	[45TE]
k	2i	Vln. 1 + 2, Vla., Vc.	[2368]
l	2j	Acc., Tbn. 1 + 2	[2389]
m	2o	Acc.	[278]
n	2q	Vln. 1	4
o	2r	Vln. 1 + 2, Vla., Vc.	[789T]
p	3c	Picc. 1	9
q	3c	Acc., Vln. 1 + Vln. 2	[89T]
r	3d	Vln. 1 + 2, Vla., Vc.	[48]
s	3f	Tpt. 1, Hrn. 1	E
t	3g	Acc., Vln. 1 + 2, Vla., Vc.	[TE01]
u	3i	Acc.	[TE01]
v	3i	Vln. 1	0 w/CE 7w
w	3j	Acc.	[TE01]
x	3j	Vln. 1	0 w/CE 7x

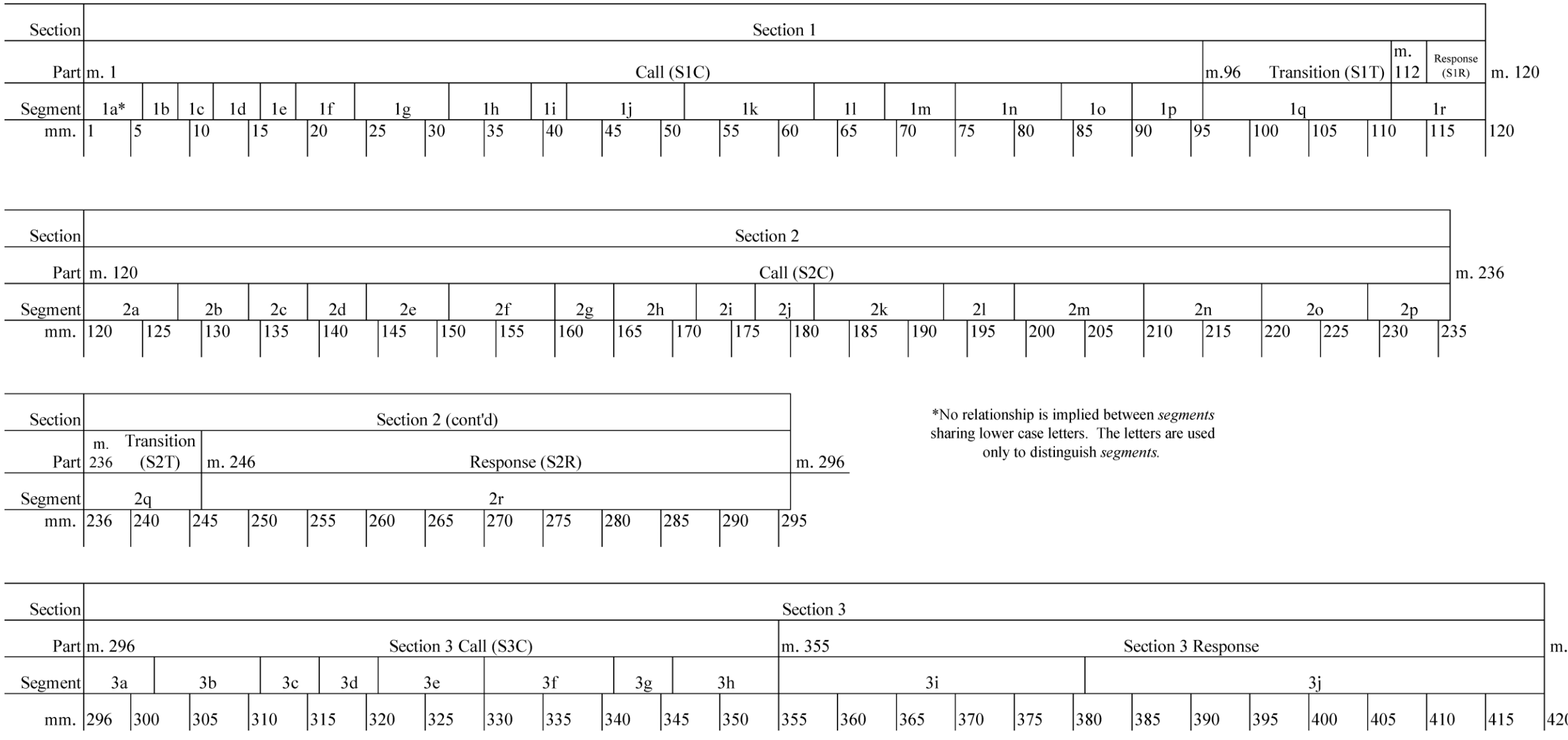
Table A.11: *Chromatic Event Group 10* in Beat Furrer's *Konzert für Klavier and Orchester*

Chromatic Event Group 10: Moving Articulated Pedals			
ID	**Location**	**Instrument**	**Notes**
a	1g	Vln. 2, Vla., Vc.	[12378] - [3459T] 8-bar M2 Ascending Glissandi
b	1k	Vln. 2, Vla., Vc.	10-bar M2 Ascending Glissandi
c	1o	Cl. 3, Sax.	{TE12}
d	2a	Cl. 1 + 2	{TE12}
e	2b	Fl. 2, Cl. 1 + 2, Sax., Hrn. 1	[45TE] - [67E0]
f	2c	Sax., Bsn. 1	{01234}
g	2d	Vln. 1 + 2, Vla., Vc.	[349T] 5-bar Wedge Glissandi
h	2e	Fl. 1 + 2, Bsn. 1, Tpt. 1 +2	[E056] - [0167]
i	2g	Winds	[01236789] - [123468T]
j	2h	Bs. Cl., Sax.	{01256}
k	2h	Vln. 2, Vla.	[0167] Pedal
l	2j	Winds, Tpt. 1 + 2	[TE014567] - [1236789]
m	2m	Vln. 2, Vla.	[2378] Converging Glissandi
n	2o	Fl. 1 + 2, Ob., Cl. 1 + 2, Bs. Cl., Tpt. 1 + 2	[TE014567] - [E0126789]
o	2q	Vln. 2, Vla.	[2378] Converging Glissandi
p	3c	Ob., Cl. 1 + 2, Bs. Cl., Sax., Tpt. 1	T2, T4, T5, T9 [012567]
q	3d	Winds + Trumpets	Various [012] Transpositions
r	3e	Vln.2, Vla	[1278] - [359T] 9-bar M9 Ascending Glissandi
s	3g	Fl. 1 + 2, Ob., Cl. 1 + 2, Bs. Cl., Tpt. 1 + 2	[234589TE] - [34569TE0]

APPENDIX B

FORMAL PARSING AND TEXT REDUCTIONS

Figure B.1: Formal Segmentation of Beat Furrer's *Konzert für Klavier and Orchester*



*No relationship is implied between *segments* sharing lower case letters. The letters are used only to distinguish *segments.*

Figure B.1: Complete formal segmentation of Beat Furrer's *Konzert für Klavier und Orchester*

Figure B.2: Text Reduction of *Section 1* of Beat Furrer's *Konzert für Klavier and Orchester*

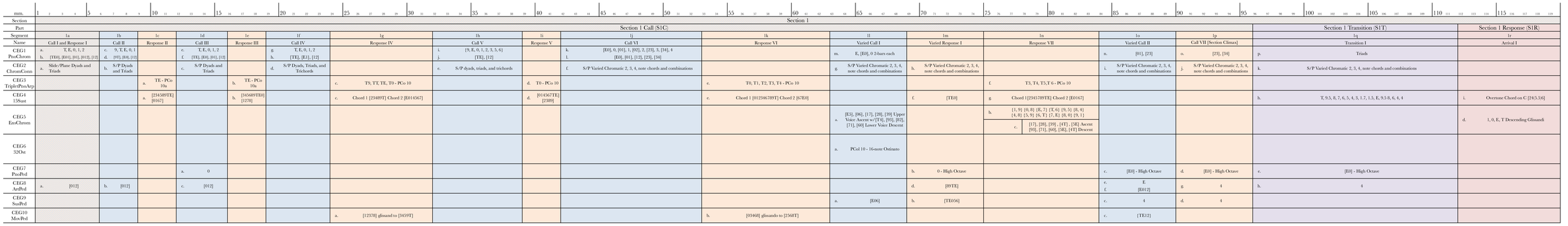


Figure B.2: Text Reduction of *Section 1* of Beat Furrer's *Konzert für Klavier and Orchester*

Figure B.3: Text Reduction of *Section 2* of Beat Furrer's *Konzert für Klavier and Orchester*

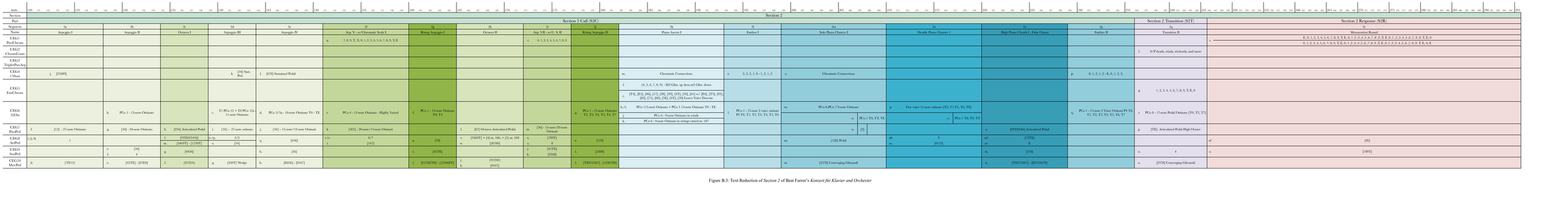


Figure B.3: Text Reduction of *Section 2* of Beat Furrer's *Konzert für Klavier and Orchester*

Figure B.4: Text Reduction of *Section 3* of Beat Furrer's *Konzert für Klavier and Orchester*

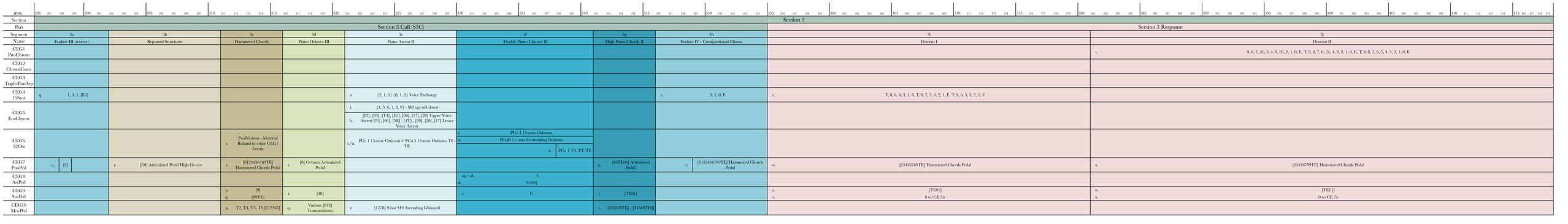


Figure B.4: Text Reduction of *Section 3* of Beat Furrer's *Konzert für Klavier and Orchester*

APPENDIX C

PITCH COLLECTIONS

Table C.1: All pitch collections used in Beat Furrer's *Konzert für Klavier and Orchester*

	All Pitch Collections Used in BFKFP																											
PCo 1	0	2	1	3	5	4	6	8	7	6	9	8	10	9	11													
PCo 2	0	2	1	3	2	5	4	6	5	2	4	3	5	4	6	5												
PCo 3	0	2	1	3	5	4	6	8	7	2																		
PCo 3a	0	2	1	3	5	4	6	8	5	2																		
PCo 4	0	2	1	3	5	8	7	10	5	4	6	5	2															
PCo 5	0	6	8	10	11	1	3	11	2	3	5	7	9															
PCo 6	0	2	1	3	2	4	3	5	4																			
PCo 7	0	2	1	3	2	4	3	0	2																			
PCo 8	0	2	1	3	5	2	4	6	8	9	7	9	8	10	9	11	1											
PCo 9	0	2	1	3	2	4	3	5	4	6	5																	
PCo 10	0	6	1	8	2	9 7	4	10	5	11 6	0	5	4 11	1 3	2 9	4 0	6	6	1 11	7	8	9	6 3	10 5	11	0	11 6	
PCo 11	0	2	1	3	5	1	4	3	5	4	6																	
PCo 12	0	1	3	2	4	3	5	4	1	3	2																	
PCo 12a	0	2	4	3	5	4	6	5	2	4	3																	
PCo 13	0	1	2	3	4	5	6	7	8	9	10	11																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	

Table C.2: PCo 1 used in Beat Furrer's *Konzert für Klavier and Orchester*

Pitch Collection 1														
0	2	1	3	5	4	6	8	7	6	9	8	10	9	11
1	3	2	4	6	5	7	9	8	7	10	9	11	10	0
2	4	3	5	7	6	8	10	9	8	11	10	0	11	1
3	5	4	6	8	7	9	11	10	9	0	11	1	0	2
4	6	5	7	9	8	10	0	11	10	1	0	2	1	3
5	7	6	8	10	9	11	1	0	11	2	1	3	2	4
6	8	7	9	11	10	0	2	1	0	3	2	4	3	5
7	9	8	10	0	11	1	3	2	1	4	3	5	4	6
8	10	9	11	1	0	2	4	3	2	5	4	6	5	7
9	11	10	0	2	1	3	5	4	3	6	5	7	6	8
10	0	11	1	3	2	4	6	5	4	7	6	8	7	9
11	1	0	2	4	3	5	7	6	5	8	7	9	8	10
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Table C.3: PCo 2 used in Beat Furrer's *Konzert für Klavier and Orchester*

Pitch Collection 2															
0	2	1	3	2	5	4	6	5	2	4	3	5	4	6	5
1	3	2	4	3	6	5	7	6	3	5	4	6	5	7	6
2	4	3	5	4	7	6	8	7	4	6	5	7	6	8	7
3	5	4	6	5	8	7	9	8	5	7	6	8	7	9	8
4	6	5	7	6	9	8	10	9	6	8	7	9	8	10	9
5	7	6	8	7	10	9	11	10	7	9	8	10	9	11	10
6	8	7	9	8	11	10	0	11	8	10	9	11	10	0	11
7	9	8	10	9	0	11	1	0	9	11	10	0	11	1	0
8	10	9	11	10	1	0	2	1	10	0	11	1	0	2	1
9	11	10	12	11	2	1	3	2	11	1	0	2	1	3	2
10	0	11	13	0	3	2	4	3	0	2	1	3	2	4	3
11	1	0	14	1	4	3	5	4	1	3	2	4	3	5	4
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Table C.4: PCo 3 used in Beat Furrer's *Konzert für Klavier and Orchester*

Pitch Collection 3									
0	2	1	3	5	4	6	8	7	2
1	3	2	4	6	5	7	9	8	3
2	4	3	5	7	6	8	10	9	4
3	5	4	6	8	7	9	11	10	5
4	6	5	7	9	8	10	0	11	6
5	7	6	8	10	9	11	1	0	7
6	8	7	9	11	10	0	2	1	8
7	9	8	10	0	11	1	3	2	9
8	10	9	11	1	0	2	4	3	10
9	11	10	0	2	1	3	5	4	11
10	0	11	1	3	2	4	6	5	0
11	1	0	2	4	3	5	7	6	1
1	2	3	4	5	6	7	8	9	10

Table C.5: PCo 3a used in Beat Furrer's *Konzert für Klavier and Orchester*

Pitch Collection 3A									
0	2	1	3	5	4	6	8	5	2
1	3	2	4	6	5	7	9	6	3
2	4	3	5	7	6	8	10	7	4
3	5	4	6	8	7	9	11	8	5
4	6	5	7	9	8	10	0	9	6
5	7	6	8	10	9	11	1	10	7
6	8	7	9	11	10	0	2	11	8
7	9	8	10	0	11	1	3	0	9
8	10	9	11	1	0	2	4	1	10
9	11	10	0	2	1	3	5	2	11
10	0	11	1	3	2	4	6	3	0
11	1	0	2	4	3	5	7	4	1
1	2	3	4	5	6	7	8	9	10

Table C.6: PCo 4 used in Beat Furrer's *Konzert für Klavier and Orchester*

Pitch Collection 4												
0	2	1	3	5	1	4	3	5	4	6	5	2
1	3	2	4	6	2	5	4	6	5	7	6	3
2	4	3	5	7	3	6	5	7	6	8	7	4
3	5	4	6	8	4	7	6	8	7	9	8	5
4	6	5	7	9	5	8	7	9	8	10	9	6
5	7	6	8	10	6	9	8	10	9	11	10	7
6	8	7	9	11	7	10	9	11	10	0	11	8
7	9	8	10	0	8	11	10	0	11	1	0	9
8	10	9	11	1	9	0	11	1	0	2	1	10
9	11	10	0	2	10	1	0	2	1	3	2	11
10	0	11	1	3	11	2	1	3	2	4	3	0
11	1	0	2	4	0	3	2	4	3	5	4	1
1	2	3	4	5	6	7	8	9	10	11	12	13

Table C.7: PCo 5 used in Beat Furrer's *Konzert für Klavier and Orchester*

Pitch Collection 5														
0	6	8	10	11	1	3	5	11	2	3	5	7	9	11
1	7	9	11	0	2	4	6	0	3	4	6	8	10	0
2	8	10	0	1	3	5	7	1	4	5	7	9	11	1
3	9	11	1	2	4	6	8	2	5	6	8	10	0	2
4	10	0	2	3	5	7	9	3	6	7	9	11	1	3
5	11	1	3	4	6	8	10	4	7	8	10	0	2	4
6	0	2	4	5	7	9	11	5	8	9	11	1	3	5
7	1	3	5	6	8	10	0	6	9	10	0	2	4	6
8	2	4	6	7	9	11	1	7	10	11	1	3	5	7
9	3	5	7	8	10	0	2	8	11	0	2	4	6	8
10	4	6	8	9	11	1	3	9	0	1	3	5	7	9
11	5	7	9	10	0	2	4	10	1	2	4	6	8	10
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Table C.8: PCo 6 used in Beat Furrer's *Konzert für Klavier and Orchester*

Pitch Collection 6								
0	2	1	3	2	4	3	5	4
1	3	2	4	3	5	4	6	5
2	4	3	5	4	6	5	7	6
3	5	4	6	5	7	6	8	7
4	6	5	7	6	8	7	9	8
5	7	6	8	7	9	8	10	9
6	8	7	9	8	10	9	11	10
7	9	8	10	9	11	10	0	11
8	10	9	11	10	0	11	1	0
9	11	10	0	11	1	0	2	1
10	0	11	1	0	2	1	3	2
11	1	0	2	1	3	2	4	3
1	2	3	4	5	6	7	8	9

Table C.9: PCo 7 used in Beat Furrer's *Konzert für Klavier and Orchester*

Pitch Collection 7								
0	2	1	3	2	4	3	0	2
1	3	2	4	3	5	4	1	3
2	4	3	5	4	6	5	2	4
3	5	4	6	5	7	6	3	5
4	6	5	7	6	8	7	4	6
5	7	6	8	7	9	8	5	7
6	8	7	9	8	10	9	6	8
7	9	8	10	9	11	10	7	9
8	10	9	11	10	0	11	8	10
9	11	10	0	11	1	0	9	11
10	0	11	1	0	2	1	10	0
11	1	0	2	1	3	2	11	1
1	2	3	4	5	6	7	8	9

Table C.10: PCo 8 used in Beat Furrer's *Konzert für Klavier and Orchester*

Pitch Collection 8																
0	2	1	3	5	2	4	6	8	9	7	9	8	10	9	11	1
1	3	2	4	6	3	5	7	9	10	8	10	9	11	10	0	2
2	4	3	5	7	4	6	8	10	11	9	11	10	0	11	1	3
3	5	4	6	8	5	7	9	11	0	10	0	11	1	0	2	4
4	6	5	7	9	6	8	10	0	1	11	1	0	2	1	3	5
5	7	6	8	10	7	9	11	1	2	0	2	1	3	2	4	6
6	8	7	9	11	8	10	0	2	3	1	3	2	4	3	5	7
7	9	8	10	0	9	11	1	3	4	2	4	3	5	4	6	8
8	10	9	11	1	10	0	2	4	5	3	5	4	6	5	7	9
9	11	10	0	2	11	1	3	5	6	4	6	5	7	6	8	10
10	0	11	1	3	0	2	4	6	7	5	7	6	8	7	9	11
11	1	0	2	4	1	3	5	7	8	6	8	7	9	8	10	0
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

Table C.11: PCo 9 used in Beat Furrer's *Konzert für Klavier and Orchester*

Pitch Collection 9										
0	2	1	3	2	4	3	5	4	6	5
1	3	2	4	3	5	4	6	5	7	6
2	4	3	5	4	6	5	7	6	8	7
3	5	4	6	5	7	6	8	7	9	8
4	6	5	7	6	8	7	9	8	10	9
5	7	6	8	7	9	8	10	9	11	10
6	8	7	9	8	10	9	11	10	0	11
7	9	8	10	9	11	10	0	11	1	0
8	10	9	11	10	0	11	1	0	2	1
9	11	10	0	11	1	0	2	1	3	2
10	0	11	1	0	2	1	3	2	4	3
11	1	0	2	1	3	2	4	3	5	4
1	2	3	4	5	6	7	8	9	10	11

Table C.12: PCo 10 used in Beat Furrer's *Konzert für Klavier and Orchester*

Pitch Collection 10																									
0	6	1	8	2	9 7	4	10	5	11 6	0	5	4 11	7 3	2 9	5 0	6	6	1 11	7	8	9	8 3	10 5	11	0	11 6
1	7	2	9	3	10 8	5	11	6	0 7	1	6	5 0	8 4	3 10	6 1	7	7	2 0	8	9	10	9 4	11 6	0	1	0 7
2	8	3	10	4	11 9	6	0	7	1 8	2	7	6 1	9 5	4 11	7 2	8	8	3 1	9	10	11	10 5	0 7	1	2	1 8
3	9	4	11	5	0 10	7	1	8	2 9	3	8	7 2	10 6	5 0	8 3	9	9	4 2	10	11	0	11 6	1 8	2	3	2 9
4	10	5	0	6	1 11	8	2	9	3 10	4	9	8 3	11 7	6 1	9 4	10	10	5 3	11	0	1	0 7	2 9	3	4	3 10
5	11	6	1	7	2 0	9	3	10	4 11	5	10	9 4	0 8	7 2	10 5	11	11	6 4	0	1	2	1 8	3 10	4	5	4 11
6	0	7	2	8	3 1	10	4	11	5 0	6	11	10 5	1 9	8 3	11 6	0	0	7 5	1	2	3	2 9	4 11	5	6	5 0
7	1	8	3	9	4 2	11	5	0	6 1	7	0	11 6	2 10	9 4	0 7	1	1	8 6	2	3	4	3 10	5 0	6	7	6 1
8	2	9	4	10	5 3	0	6	1	7 2	8	1	0 7	3 11	10 5	1 8	2	2	9 7	3	4	5	4 11	6 1	7	8	7 2
9	3	10	5	11	6 4	1	7	2	8 3	9	2	1 8	4 0	11 6	2 9	3	3	10 8	4	5	6	5 0	7 2	8	9	8 3
10	4	11	6	0	7 5	2	8	3	9 4	10	3	2 9	5 1	0 7	3 10	4	4	11 9	5	6	7	6 1	8 3	9	10	9 4
11	5	0	7	1	8 6	3	9	4	10 5	11	4	3 10	6 2	1 8	4 11	5	5	0 10	6	7	8	7 2	9 4	10	11	10 5
0	6	1	8	2	9 7	4	10	5	11 6	0	5	4 11	7 3	2 9	5 0	6	6	1 11	7	8	9	8 3	10 5	11	0	11 6
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27

Table C.13: PCo 10a used in Beat Furrer's *Konzert für Klavier and Orchester*

PC10	Pitch Collection 10a																				
0	4	10	5	11 6	0	5	4 11	7 3	2 9	5 0	6	6	1 11	7	8	9	8 3	10 5	11	0	11 6
1	5	11	6	0 7	1	6	5 0	8 4	3 10	6 1	7	7	2 0	8	9	10	9 4	11 6	0	1	0 7
2	6	0	7	1 8	2	7	6 1	9 5	4 11	7 2	8	8	3 1	9	10	11	10 5	0 7	1	2	1 8
3	7	1	8	2 9	3	8	7 2	10 6	5 0	8 3	9	9	4 2	10	11	0	11 6	1 8	2	3	2 9
4	8	2	9	3 10	4	9	8 3	11 7	6 1	9 4	10	10	5 3	11	0	1	0 7	2 9	3	4	3 10
5	9	3	10	4 11	5	10	9 4	0 8	7 2	10 5	11	11	6 4	0	1	2	1 8	3 10	4	5	4 11
6	10	4	11	5 0	6	11	10 5	1 9	8 3	11 6	0	0	7 5	1	2	3	2 9	4 11	5	6	5 0
7	11	5	0	6 1	7	0	11 6	2 10	9 4	0 7	1	1	8 6	2	3	4	3 10	5 0	6	7	6 1
8	0	6	1	7 2	8	1	0 7	3 11	10 5	1 8	2	2	9 7	3	4	5	4 11	6 1	7	8	7 2
9	1	7	2	8 3	9	2	1 8	4 0	11 6	2 9	3	3	10 8	4	5	6	5 0	7 2	8	9	8 3
10	2	8	3	9 4	10	3	2 9	5 1	0 7	3 10	4	4	11 9	5	6	7	6 1	8 3	9	10	9 4
11	3	9	4	10 5	11	4	3 10	6 2	1 8	4 11	5	5	0 10	6	7	8	7 2	9 4	10	11	10 5
0	4	10	5	11 6	0	5	4 11	7 3	2 9	5 0	6	6	1 11	7	8	9	8 3	10 5	11	0	11 6
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

Table C.14: PCo 11 used in Beat Furrer's *Konzert für Klavier and Orchester*

Pitch Collection 11										
0	2	1	3	5	1	4	3	5	4	6
1	3	2	4	6	2	5	4	6	5	7
2	4	3	5	7	3	6	5	7	6	8
3	5	4	6	8	4	7	6	8	7	9
4	6	5	7	9	5	8	7	9	8	10
5	7	6	8	10	6	9	8	10	9	11
6	8	7	9	11	7	10	9	11	10	0
7	9	8	10	0	8	11	10	0	11	1
8	10	9	11	1	9	0	11	1	0	2
9	11	10	0	2	10	1	0	2	1	3
10	0	11	1	3	11	2	1	3	2	4
11	1	0	2	4	0	3	2	4	3	5
1	2	3	4	5	6	7	8	9	10	11

Table C.15: PCo 12 used in Beat Furrer's *Konzert für Klavier and Orchester*

Pitch Collection 12										
1	2	4	3	5	4	6	5	3	4	3
2	3	5	4	6	5	7	6	4	5	4
3	4	6	5	7	6	8	7	5	6	5
4	5	7	6	8	7	9	8	6	7	6
5	6	8	7	9	8	10	9	7	8	7
6	7	9	8	10	9	11	10	8	9	8
7	8	10	9	11	10	0	11	9	10	9
8	9	11	10	0	11	1	0	10	11	10
9	10	0	11	1	0	2	1	11	0	11
10	11	1	0	2	1	3	2	12	1	0
11	0	2	1	3	2	4	3	0	2	1
0	1	3	2	4	3	5	4	1	3	2

Table C.16: PCo 12a used in Beat Furrer's *Konzert für Klavier and Orchester*

Pitch Collection 12a										
0	2	4	3	5	4	6	5	3	4	3
1	3	5	4	6	5	7	6	4	5	4
2	4	6	5	7	6	8	7	5	6	5
3	5	7	6	8	7	9	8	6	7	6
4	6	8	7	9	8	10	9	7	8	7
5	7	9	8	10	9	11	10	8	9	8
6	8	10	9	11	10	0	11	9	10	9
7	9	11	10	0	11	1	0	10	11	10
8	10	0	11	1	0	2	1	11	0	11
9	11	1	0	2	1	3	2	12	1	0
10	0	2	1	3	2	4	3	0	2	1
11	1	3	2	4	3	5	4	1	3	2

Table C.17: PCo 13 used in Beat Furrer's *Konzert für Klavier and Orchester*

Pitch Collection 13											
0	1	2	3	4	5	6	7	8	9	10	0
1	2	3	4	5	6	7	8	9	10	0	1
2	3	4	5	6	7	8	9	10	0	1	2
3	4	5	6	7	8	9	10	0	1	2	3
4	5	6	7	8	9	10	0	1	2	3	4
5	6	7	8	9	10	0	1	2	3	4	5
6	7	8	9	10	0	1	2	3	4	5	6
7	8	9	10	0	1	2	3	4	5	6	7
8	9	10	0	1	2	3	4	5	6	7	8
9	10	0	1	2	3	4	5	6	7	8	9
10	0	1	2	3	4	5	6	7	8	9	10
0	1	2	3	4	5	6	7	8	9	10	11

APPENDIX D

CHROMATIC EVENT SUB-GROUPS

Table D.1: The *CE 1a* sub-group in Beat Furrer's *Konzert für Klavier and Orchester*

CE 1a Sub-Group			
ID	Location	Instrument	Notes
CE 1c	1a	Ensemble Piano	T, E, 0, 1, 2 Rising Chromatic Ascent
CE 1a	1b	Ensemble Piano	9, T, E, 0, 1 Rising Chromatic Ascent
CE 1e	1d	Ensemble Piano	T, E, 0, 1, 2 Rising Chromatic Ascent
CE 1g	1f	Ensemble Piano	T, E, 0, 1, 2 Rising Chromatic Ascent
CE 1i	1h	Ensemble Piano	{9E012356} Free, loose wedge with moment on 3
CE 1k	1j	Ensemble Piano	[E0], 0, [01], 1, [02], 2, [23], 3, [34], 4
CE 1m	1l	Ensemble Piano	E, [E0], 0 2-bars each

Figure D.2: The *CE 1b* sub-group in Beat Furrer's *Konzert für Klavier and Orchester*

CE 1b Sub-Group			
ID	Location	Instrument	Notes
CE 1b	1a	Solo Piano	[TE0], [E01], [01], [012], [12]
CE 1d	1b	Solo Piano	[9T], [E0], [12]
CE 1f	1d	Solo Piano	[TE], [E0], [01], [12]
CE 1h	1f	Solo Piano	[TE], [E1], [12]
CE 1j	1h	Solo Piano	[TE], [12]
CE 1l	1j	Solo Piano	[E0], [01], [12], [23], [34]
CE 1n	1o	Solo Piano	[01, [23]
CE 1o	1p	Solo Piano	[23], [34]

Table D.3: The *CE 1q* sub-group in Beat Furrer's *Konzert für Klavier and Orchester*

CE 1q Sub-Group			
ID	Location	Instrument	Notes
CE 1q	2f	Solo Piano	7, 8, 9, T, E, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, T, E
CE 1r	2i	Solo Piano	0, 1, 2, 3, 4, 5, 6, 7, 8, 9

Table D.4: The *CE 1s* sub-group in Beat Furrer's *Konzert für Klavier and Orchester*

CE 1s Sub-Group			
ID	Location	Instrument	Notes
CE 1s	2r	Solo Piano	Mensuration Canon
CE 1t	3j	Ensemble Piano	Ending Descent - 9, 8, 7, (6), 5, 4, (3), 2, 1, 0, E, T, 9, 8, 7, 6, (5), 4, 3, 2, 1, 0, E, T, 9, 8, 7, 6, 5, 4, 3, 2, 1, 0, E

Table D.5: The *CE 2a* sub-group in Beat Furrer's *Konzert für Klavier and Orchester*

CE 2a Sub-Group			
ID	Location	Instrument	Notes
CE 2a	1a	Solo Piano	Slide/Plane Piano Dyads (implying major triads)
CE 2b	1b	Solo Piano	Slide/Plane dyads or triads (major or implying major)
CE 2c	1d	Solo Piano	Slide/Plane dyads or triads (all major or minor except on M2 dyad)
CE 2d	1f	Solo Piano	Slide/Plane dyads, triads [major/minor], or trichords [025] [027]
CE 2e	1h	Solo Piano	Slide/Plane dyads, triads [major/minor], or trichords [025] [027]
CE 2f	1j	Solo Piano	Slide/Plane dyads, triads [major/minor], trichords [025] [027], or hexachords mostly with a [017] sound in the bass and a major or minor triad on top
CE 2g	1l	Solo Piano	Slide/Plane dyads, triads, trichords, tetrachords, hexachords, heptachords, or octachords with occasional P5 clusters
CE 2h	1m	Solo Piano, Ensemble Piano	Slide/Plane Varied Chromatic Material
CE 2i	1o	Solo Piano, Ensemble Piano	Slide/Plane Varied Chromatic Material
CE 2j	1p	Solo Piano, Ensemble Piano	Slide/Plane Varied Chromatic Material

Table D.6: *CEG 3* in Beat Furrer's *Konzert für Klavier and Orchester*

CEG 3			
ID	Location	Instrument	Notes
CE 3a	1c	Solo Piano	TE - PCo 10a
CE 3b	1e	Solo Piano	T0 - PCo 10a
CE 3c	1g	Solo Piano	T9, TT, TE, T0, T1 - PCo 10 w/rests
CE 3d	1i	Solo Piano	T0 - PCo 10
CE 3e	1k	Solo Piano	T0, T1, T2, T3, T4 - PCo 10 w/shifts
CE 3f	ln	Solo Piano	T3, T4, T5, T6 - PCo 10 hemiola 4:9

Table D.7: The *CE 4a* sub-group in Beat Furrer's *Konzert für Klavier and Orchester*

CE 4a Sub-Group			
ID	Location	Instrument	Notes
CE 4a	1c	Winds, Brass, Acc., Crotales, Strings	Chord 1 [234589TE] Chord 2 [0167]
CE 4b	1e	Winds, Brass, Acc., Crotales, Strings	Chord 1[345689TE0] Chord 2 [1278]
CE 4c	1g	Winds, Brass, Acc., Crotales, Strings	Chord 1 [23489T] Chord 2 [E014567]
CE 4d	1i	Winds, Brass, Acc., Crotales, Strings	Chord 1 [014567TE] Chord 2 [2389]
CE 4e	1k	Winds, Brass, Acc., Crotales, Strings	Chord 1 [012346789T] Chord 2 [67E0]
CE 4g	1n	Winds, Brass, Acc., Crotales, Strings	Chord 1 [2345789TE] Chord 2 [E0167]

Table D.8: The *CE 4m* sub-group in Beat Furrer's *Konzert für Klavier and Orchester*

CE 4m Sub-Group			
ID	Location	Instrument	Notes
CE 4m	2k	Fl.. 1, Ob.1, Tpt. 1, Acc.	Chromatic Connections (CEG6)
CE 4n	2l	Ens. (no Perc.)	2, 3, 2, 1, 0 - 1, 2, 1, 2
CE 4o	2m	Ob. 1, Tpt. 1, Hrns. 1+2, Dbl. Bs.	Chromatic Connections (CEG6)
CE 4p	2p	Ens. (no Perc.)	0, 1, 2, 1, 2 - E, 0, 1, 2, 3
CE 4q	3a	Ens. (no Perc.)	1, 0, 1, [E0]
CE 4r	3e	Ens. (no Perc.)	2, 1, 0 - 0, 1, 2 Voice Exchange
CE 4s	3h	Ens. (no Perc.)	0, 1, 0, E

Table D.9: The *CE 5a* sub-group in Beat Furrer's *Konzert für Klavier and Orchester*

CE 5a Sub-Group			
ID	Location	Instrument	Notes
CE 5a	1l	Vln. 1 + 2, Vla., Vc.	[E5], [06], [17], [28], [39] Upper Voice Ascent w/[T4], [93], [82], [71], [60] Lower Voice Descent
CE 5c	1n, m. 78	Vln. 2, Vla., Vc.	[17], [28], [39] , [4T] , [5E] Upper Voice Ascent w/[93], [71], [60], [5E], [4T] Lower Voice Descent
CE 5e	2k	Vln. 2, Vc.	[T4], [E5], [06], [17], [28], [39], [4T], [50], [61]Upper Voice Ascent w/ [E4], [T3], [93], [82], [71], [60], [5E], [4T], [39] Lower Voice Descent
CE 5h	3e	Vln. 1, Vc.	[82], [93], [T4], [E5], [06], [17], [28] Upper Voice Ascent [71], [60], [5E] , [4T] , [39], [20], [17] Lower Voice Ascent

Figure A4.9: The *CE 5b* sub-group in Beat Furrer's *Konzert für Klavier and Orchester*

CE 5b Sub-Group			
ID	Location	Instrument	Notes
CE 5b	1n	Rin on Timpani (Perc. 1 + 3)	Two-voice ascending M3 descending m3 glissandi starting on [4] and descending M3 ascending m3 starting on [1] resulting in voice exchange
CE 5d	1r	Chinese Cymbal on Timpani (Perc. 1 + 3)	1, 0, E, T Descending Glissandi
CE 5f	2k	m. 182 Rin on Timpano (Perc. 3)	4, 5, 6, 7, 8, 9 (M3 Ascending Glissandi, then m3 Descending Glissandi)
CE 5g	2q	Perc. 1 + 3	1, 2, 3, 4, 5, 6, 7, 8, 9, T, E, 0
CE 5i	3e	Rin on Timpano (Perc. 3)	4, 5, 6, 7, 8, 9 M3 (Glissando Ascent then m3 Glissando Descent)

Table D.10: The *CE 6h* sub-group in Beat Furrer's *Konzert für Klavier and Orchester*

CE 6h Sub-Group				
ID	Location	Instrument	PCo	Notes
CE 6h	2k	Solo Piano R. H.	PCo 1	15-note ostinato T0-TE elongated with rests
CE 6i	2k	Solo Piano L. H.	PCo 5	13-note ostinato T0-TE elongated with rests converges into CEG7g
CE 6t	3e	Solo Piano R. H.	PCo 1	15-note ostinato T0-TE
CE 6u	3e	Solo Piano L. H.	PCo 5	13-note ostinato T0-TE converges into CEG7g

Table D.11: The *CE 10a* sub-group in Beat Furrer's *Konzert für Klavier and Orchester*

CE 10a Sub-Group			
ID	Location	Instrument	Notes
CE 10a	1g	Vln. 2, Vla., Vc.	[12378] - [3459T] 8-bar M2 Ascending Glissandi
CE 10b	1k	Vln. 2, Vla., Vc.	10-bar M2 Ascending Glissandi
CE 10g	2d	Vln. 1 + 2, Vla., Vc.	[349T] 5-bar Wedge Glissandi
CE 10m	2m	Vln. 2, Vla.	[2378] Converging Glissandi
CE 10o	2q	Vln. 2, Vla.	[2378] Converging Glissandi
CE 10r	3e	Vln.2, Vla	[1278] - [359T] 9-bar M9 Ascending Glissandi

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